Tega Cay Water Service, Inc.
Docket No. 2009-473-WS

BEFORE THE

PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

PREPARED DIRECT TESTIMONY

OF

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PRINCIPAL
AUS CONSULTANTS

ON BEHALF OF

TEGA CAY WATER SERVICE, INC.

APRIL 2010

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.

A. My name is Pauline M. Ahern. I am a Principal of AUS Consultants. My business address is 155 Gaither Drive, Suite A, Mt. Laurel, New Jersey 08054.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I am a graduate of Clark University, Worcester, MA, where I received a Bachelor of Arts degree with honors in Economics in 1973. In 1991, I received a Master of Business Administration with high honors from Rutgers University.

In June 1988, I joined AUS Consultants as a Financial Analyst and am now a Principal. I am responsible for the preparation of all fair rate of return and capital structure exhibits for AUS Consultants having offered expert testimony on behalf of investor-owned utilities before twenty-five state regulatory commissions. The details of these appearances, as well as details of my educational background, are shown in Appendix A supplementing this testimony.

I am also the Publisher of AUS Utility Reports (formerly C.A. Turner), where I am responsible for the production, publication, distribution and marketing of various reports. AUS Utility Reports provides financial data and related ratios as well as merger and acquisition activity covering more than 100 public utility companies on a monthly, quarterly, and annual basis. Coverage includes electric, combination gas and electric, gas distribution, gas transmission, telephone, water and international utilities.

I also calculate and maintain the A.G.A. Index under contract with the American Gas Association (A.G.A.), which serves as the benchmark against which the performance of the American Gas Index Fund (AGIF) is measured on a monthly basis. The A.G.A. Index and AGIF are a market capitalization weighted index and fund, respectively, comprised of the common stocks of the publicly traded corporate members of the A.G.A.

I have co-authored a working paper with Frank J. Hanley, a Principal and Director of AUS Consultants, Dylan W. D'Ascendis, an Associate of AUS Consultants and Richard A. Michelfelder, Ph.D., a professor of finance at the School of Business, Rutgers University and a Managing Director of AUS Consultants entitled "New Approach for Estimating the Equity Risk Premium for Public Utilities", which was presented at the Spring 2010 meeting of the Staff Subcommittee on Accounting and Finance of the National Association of Regulatory Commissioners (NARUC) on March 17, 2010 in Charleston, SC. I have also co-authored a working paper (currently under review for publication) also with Mr. Hanley and Dr. Michelfelder entitled "New Approach to Estimating the Cost of Common Equity for Public Utilities" which was presented at the Advanced Workshop in Regulation and Competition at the 28th Annual Eastern Conference of the Center for Research in Regulated Industries (CRRI) at Rutgers University on May 14, 2009. I have also co-authored a second article with Frank J. Hanley entitled "Comparable Earnings: New Life for an Old Precept" which was published in the American Gas Association's Financial Quarterly Review, Summer 1994. I also assisted in the preparation of an

article authored by Frank J. Hanley and A. Gerald Harris entitled "Does Diversification Increase the Cost of Equity Capital?" published in the July 15, 1991 issue of Public Utilities Fortnightly.

I am a member of the Society of Utility and Regulatory Financial Analysts (SURFA, formerly the National Society of Rate of Return Analysts) serving as President since 2006, being reelected in 2008 with a term ending in 2010. Previously, I held the position of Secretary/Treasurer for 2004-2006. In 1992, I was awarded the professional designation "Certified Rate of Return Analyst" (CRRA) by SURFA, which is based upon education, experience and the successful completion of a comprehensive written examination.

I am an associate member of the National Association of Water Companies, serving on its Finance/Accounting/Taxation Committee, a member of the Energy Association of Pennsylvania, formerly the Pennsylvania Gas Association, and a member of the American Finance and Financial Management Associations.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose is to provide testimony on behalf of Tega Cay Water Service, Inc. (Tega Cay) relative to the range of overall rate of return including common equity cost rate, senior capital cost rate and capital structure which it should be afforded the opportunity to earn on its jurisdictional rate base which will be discussed subsequently.

Q. HAVE YOU PREPARED AN EXHIBIT WHICH SUPPORTS YOUR RECOMMENDED RANGE OF OVERALL FAIR RATE OF RETURN?

A. Yes. It has been marked for identification as Exhibit PMA-1 and consists of Schedules 1 to 12. Hereinafter, references to Schedules within this testimony will be from this Exhibit, unless otherwise noted.

II. SUMMARY

Q. PLEASE SUMMARIZE YOUR RECOMMENDED RANGE OF OVERALL COST OF CAPITAL AND FAIR RATE OF RETURN.

A. I recommend that the Public Service Commission of South Carolina (PSC SC or the Commission) authorize the Company the opportunity to earn a range of overall rate of return of 8.65% - 8.91% based upon the consolidated capital structure at March 31, 2010 of Utilities, Inc., the parent of Tega Cay, consisting of 52.30% long-term debt and 47.70% common equity at a debt cost rate of 6.60% and my recommended range of common equity cost rate of 10.90% - 11.45% as summarized on Schedule 1, page 1.

Q. PLEASE SUMMARIZE YOUR RECOMMENDED RANGE OF COMMON EQUITY COST RATE.

A. My recommended range of common equity cost rate of 10.90% - 11.45% is summarized on page 2 of Schedule 1. Because Tega Cay's common stock is not publicly traded, a market-based common equity cost rate cannot be determined directly for the Company. Consequently, in arriving at my recommended range of common equity cost rate of 10.90% - 11.45%, I have assessed the market-based cost rates of companies of relatively similar, but not identical risk, i.e., proxy group(s), for insight into a recommended common equity cost rate applicable to Tega Cay and suitable for cost of capital

purposes. Using other utilities of relatively comparable risk as proxies is consistent with the principles of fair rate of return established in the Hope[1] and Bluefield[2] cases and adds reliability to the informed expert judgment necessary to arrive at a recommended common equity cost rate. However, no proxy group(s) can be selected to be identical in risk to Tega Cay. Therefore, the proxy group(s') results must be adjusted if necessary, to reflect the greater relative business and/or financial risk of Tega Cay, as will be subsequently discussed in detail.

Consistent with the Efficient Market Hypothesis (EMH) which will be discussed in more detail below, my recommendation results from the application of four well-tested market-based cost of common equity models, the Discounted Cash Flow ("DCF") approach, the Risk Premium Model ("RPM"), the Capital Asset Pricing Model ("CAPM"), and the Comparable Earnings Model ("CEM").

The results derived from each are as follows:

[1] Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591 (1944).

[2] Bluefield Water Works Improvement Co. v. Public Serv. Comm'n, 262 U.S. 679 (1922).

Table 1

	Proxy Group of Six AUS Utility Reports Water Companies	Proxy Group of Ten AUS Utility Rpts. Gas Distribution Companies
Discounted Cash Flow Model	11.70%	9.42%
Risk Premium Model	10.56	10.53
Capital Asset Pricing Model	10.37	10.04
Comparable Earnings Model	14.00	NMF
Indicated Common Equity Cost Rate Before Adjustment for Business Risk	11.15%	10.00%
Business Risk Adjustment	0.30	0.40
Indicated Common Equity Cost Rate After Adjustment for Business Risk	11.45%	10.40%
Recommended Common Equity Cost Rate	10.90% - 11.45%	

After reviewing the cost rates based upon the four models, I conclude that common equity cost rates of 11.15% and 10.00% are indicated based upon the application of all four models to the market data of the proxy groups of six AUS Utility Reports water companies and ten AUS Utility Reports natural gas distribution companies, (LDCs), respectively before any adjustments for business and/or financial/credit risk. The indicated common equity cost rates based upon the six water companies were adjusted upward by 30 basis points (0.30%) and the ten LDCs were adjusted upward by 40 basis points (0.40%) to reflect Tega Cay's increased business risk due to its smaller size relative to the

water companies and LDCs, respectively. After adjustment, the risk-adjusted common equity cost rates are 11.45% for the water company proxy group and 10.40% for the LDCs. My recommended range of common equity cost rate for Tega Cay is 10.90% - 11.45%.

III. GENERAL PRINCIPLES

Q. WHAT GENERAL PRINCIPLES HAVE YOU CONSIDERED IN ARRIVING AT YOUR RECOMMENDED RANGE OF COMMON EQUITY COST RATE OF 10.90% - 11.45%?

A. In unregulated industries, the competition of the marketplace is the principal determinant of the price of a product or service. For regulated public utilities, regulation must act as a substitute for marketplace competition. Therefore, marketplace data must be relied upon in assessing a common equity cost rate appropriate for ratemaking purposes in order to assure that the utility can fulfill its obligations to the public and provide safe and adequate service at all times. This requires a level of earnings sufficient to maintain the integrity of presently invested capital and to permit the attraction of needed new capital at a reasonable cost in competition with other firms of comparable risk, consistent with the fair rate of return standards established by the U.S. Supreme Court in the Hope and Bluefield cases cited previously. Consequently, in my determination of common equity cost rate, I have evaluated data gathered from the marketplace for utilities as similar in risk as possible to Tega Cay.

IV. BUSINESS RISK

Q. PLEASE DEFINE BUSINESS RISK AND EXPLAIN WHY IT IS IMPORTANT TO THE DETERMINATION OF A FAIR RATE OF RETURN.

A. Business risk is the riskiness of a company's common stock without the use of debt and/or preferred capital. Examples of business risk include the quality of management, the regulatory environment, customer mix and concentration of customers, service territory growth and the like, which have a direct bearing on earnings.

Business risk is important to the determination of a fair rate of return because the greater the level of risk, the greater the rate of return investors demand, consistent with the basic financial precept of risk and return.

Q. PLEASE DISCUSS THE BUSINESS RISKS FACING THE WATER INDUSTRY IN GENERAL.

A. One of the major risks facing the water and wastewater utility industry is related to replacing aging transmission and distribution systems. Although Value Line Investment Survey[3] (Value Line) observes the following about the water utility industry, it applies equally to the wastewater utility industry as many of the water companies followed by Value Line also have wastewater operations:

> The Water Utility Industry has not been the best place to reside in recent months. Indeed, the stocks in the group have shown little, if any, share price appreciation since our October review. Some have even experienced deterioration, as the market continued to reveal signs of awaking from its earlier slumber and investor sentiment swung to more aggressive areas in an attempt to be at the forefront of a potential economic revival.

[3] Value Line Investment Survey, January 22, 2010.

> Water infrastructures are aging and in many cases require considerable maintenance and capital investment in order to meet increasingly stringent requirements. The rising costs of doing business are likely to offset most of the benefits stemming from more favorable regulatory backing that has become apparent (see below), limiting shareholder gains for both the near and long-term. It should be noted that these stocks are typically bottom-dwellers in times of prosperity and renewed confidence, with their perceived safety historically faring better in times of economic uncertainty.
>
> However, many of these authorities responsible for reviewing and ruling on general rate requests made by utilities to help recover costs, long sided with the public, creating a lop-sided and difficult backdrop for providers. That said, more recently most have had a change of heart and have been handing down more business friendly rulings on general rates in far more timely fashion.
>
> But not everything is as bright as the improving regulatory environment. In order to meet the demands of the public, providers employ millions of feet of pipes and a plethora of wells to say the least. Many of these systems were built decades ago and over the course of time have begun to decay and require significant maintenance or even complete overhauls. This coupled with the growing threat of bioterrorism will likely continue driving maintenance and infrastructure costs through the roof and forcing most in this space to seek help on the financing front because of inadequate cash levels. Meanwhile, many smaller operations, unable to survive, are closing up shop, presenting opportunities for the larger players with the flexibility to increase their customer base at relatively lower start-up costs. *Aqua America* is a prime example and thus sports some of the best long-term growth prospects. M&A activity is likely to remain hot, as the costs of doing business are expected to climb into the hundreds of millions by the next decade.
>
> At this juncture, this industry does not cater to the investment demands of most. Just about every stock in the group lacks appreciation potential, whether it be for the coming six to 12 months or the 3- to 5-year pull.

Also in its 2009 infrastructure Fact Sheet[4] published by the American Society of Civil Engineers (ASCE) they state:

> America's drinking water systems face an annual shortfall of at least $11 billion to replace aging facilities that are near the end of their useful lives and to comply with existing and future federal water regulations. This does not account for growth in the demand for drinking water over the next 20 years. Leaking pipes lose an estimated 7 billion gallons of clean drinking water a day.

In addition, because the water and wastewater industry is much more capital-intensive than the electric, natural gas or telephone industries, the investment required to produce a dollar of revenue is greater. For example, it took $3.81 of net utility plant on average to produce $1.00 in operating revenues in 2009 for the water utility industry as a whole. In contrast, for the electric, combination electric and gas, natural gas or telephone utility industries, on average it took only $2.06, $1.63, $1.18 and $0.86, respectively, to produce $1.00 in operating revenues in 2008. And, because investor-owned water and wastewater utilities typically do not receive federal funds for infrastructure replacement, the challenge to investor-owned water and wastewater utilities is exacerbated and their access to financing is restricted, thus increasing risk.

NARUC has also highlighted the challenges facing the water and wastewater industry stemming from its capital intensity. NARUC's Board of Directors adopted a resolution in July 2006, taking the position that[5]:

> WHEREAS, To meet the challenges of the water and wastewater industry which may face a combined capital investment requirement nearing one trillion dollars over a 20-year period, the following policies and mechanisms were identified to help ensure sustainable practices in promoting needed capital investment and cost-effective rates: a) the use of prospectively relevant test years; b) the distribution system improvement charge; c) construction work in progress; d) pass-through adjustments; e) staff-assisted rate

[4] 2009 American Society of Civil Engineers, Report Card for American's Infrastructure 2009.

[5] "Resolution Supporting Consideration of Regulatory Policies Deemed as 'Best Practices'", Sponsored by the Committee on Water. Adopted by the NARUC Board of Directors, July 27, 2006.

> cases; f) consolidation to achieve economies of scale; g) acquisition adjustment policies to promote consolidation and elimination of non-viable systems; h) a streamlined rate case process; i) mediation and settlement procedures; j) defined timeframes for rate cases; k) integrated water resource management; l) a fair return on capital investment; *and* m) improved communications with ratepayers and stakeholders; *and*
>
> WHEREAS, Due to the massive capital investment required to meet current and future water quality and infrastructure requirements, adequately adjusting allowed equity returns to recognize industry risk in order to provide a fair return on invested capital was recognized as crucial…
>
> RESOLVED, That the National Association of Regulatory Utility Commissions (NARUC), convened in its July 2006 Summer Meetings in Austin, Texas, conceptually supports review and consideration of the innovative regulatory policies and practices identified herein as "best practices;" *and be it further*
>
> RESOLVED, That NARUC recommends that economic regulators consider and adopt as many as appropriate of the regulatory mechanisms identified herein as best practices…

The water and wastewater utility industry also experiences lower relative depreciation rates. Lower depreciation rates, as one of the principal sources of internal cash flows for all utilities, mean that water and wastewater utility depreciation as a source of internally-generated cash is far less than for electric, natural gas or telephone utilities. Water and wastewater utilities' assets have longer lives and, hence, longer capital recovery periods. As such, water and wastewater utilities face greater risk due to inflation which results in a higher replacement cost per dollar of net plant than for other types of utilities. Water utilities experienced an average depreciation rate of 2.8% for 2009. In contrast, in 2009, the electric, combination electric and gas, natural gas or telephone industries, experienced average depreciation rates of 4.0%, 3.8%,

3.8% and 5.2%, respectively.

In addition, as noted by Standard & Poor's (S&P)[6]:

> Standard & Poor's expects the already capital-intensive water utility industry to become even more so over the next several years. Due to the aging pipeline infrastructure and more stringent quality standards, the U.S. Environmental Protection Agency's (EPA) foresees a need for $277 billion to upgrade and maintain U.S. water utilities through 2022, with about $185 billion going toward infrastructure improvements. In addition, about $200 billion will be needed for wastewater applications, which suggests increased capital spending to be a long-term trend in this industry.
>
> In line with these trends, many companies have announced aggressive capital spending programs. Forecast capital spending primarily focuses on infrastructure replacements and growth initiatives. Over the past five years, capital spending has been equivalent to about three times its depreciation expense. However, companies are now forecasting spending to be at or above four times depreciation expense over the intermediate term. For companies in regulatory jurisdictions that provide timely cost recovery for capital expenditures, the increased spending is likely to have a minimal effect on financial metrics and ratings. However, companies in areas without these mechanisms, earnings, and cash flow could be negatively affected by the increased spending levels, which over the longer term could harm a company's overall credit profile.
>
> Due to the high level of capital spending, U.S. investor-owned water utilities do not generate positive free cash flow. This, coupled with the forecast increase in capital spending over the intermediate term, will require additional access to capital markets. We expect rated water companies to have enough financial flexibility to gain that access. Ratings actions shouldn't result from this increased market activity because we expect companies to use a balanced financing approach, which should maintain debt near existing levels.

Moody's[7] also notes that:

> We expect that the credit quality of the investor-owned U.S. water

[6] Standard & Poor's, Credit Outlook For U.S. Investor-Owned Water Utilities Should Remain Stable in 2008 (January 31, 2008) 2, 4.

[7] Moody's Investors Service, Global Credit Research, "Credit Risks and Increasing for U.S. Investor Owned Water Utilities", Special Comment (January 2004) 5.

utilities will likely deteriorate over the next several years, due to ongoing large capital spending requirements in the industry. Larger capital expenditures facing the water utility industry result from the following factors:

- Continued federal and state environmental compliance requirements;
- Higher capital investments for constructing modern water treatment and filtration facilities;
- Ongoing improvement of maturing distribution and delivery infrastructure; and
- Heightened security measures for emergency preparedness designed to prevent potential terrorist acts.

Given the overwhelming importance of protecting the public health, the water utility industry remains regulated by the federal and state regulatory agencies. As a result of this importance, the level of state regulators' responsiveness is critical in enabling the water utilities to maintain their financial integrity. In addition, when utilities are permitted a fair rate of return and timely rate adjustments to reflect the costs of providing this essential service, they will be more able to implement the necessary safeguards to protect the public health.

Also, both the Congressional Budgeting Office (CBO) and the Environmental Protection Agency (EPA) have addressed the necessary future growth in water and wastewater utility infrastructure. In November 2002, the CBO published a study entitled, "Future Investment in Drinking Water and Wastewater Infrastructure" in which it concluded that[8]:

> CBO estimates that for the years 2000 to 2019, annual costs for investment will average between $11.6 billion and $20.1 billion for drinking water systems and between $13.00 billion and $20.9 billion for wastewater systems.

These estimates, over the ten years ending 2019, total from $116.0 - $201.0 billion for drinking water systems and between $130.0 - $209.0 billion for wastewater systems, totaling $246.0 - $410.0 billion for the water and

[8] "Future Investment in Drinking Water and Wastewater Infrastructure", The Congress of the United States -

wastewater industry combined.

Similarly, the EPA states the following[9]:

> The survey found that the total nationwide infrastructure need is $334.8 billions for the 20-years period from January 2007 through December 2026. With $200.8 billion in needs over the next 20 years, transmission and distribution projects represent the largest category of need. This result is consistent with the fact that transmission and distribution mains account for most of the nation's water infrastructure. The other categories, in descending order of need are: treatment, storage, source and a miscellaneous category of needs called "other". The large magnitude of the national need reflects the challenges confronting water systems as they deal with an infrastructure network that has aged considerably since these systems were constructed, in many cases, 50 to 100 years ago.

In addition, the water utility industry, as well as the electric and natural gas utility industries, faces the need for increased funds to finance the increasing security costs required to protect the water supply and infrastructure from potential terrorist attacks in the post-September 11, 2001 world.

In view of the foregoing, it is clear that the water and wastewater utility industry's high degree of capital intensity and low depreciation rates coupled with the need for substantial infrastructure capital spending and increased anti-terrorism and anti-bioterrorism security spending, requires regulatory support in the form of adequate and timely rate relief, as recognized by NARUC, so water and wastewater utilities will be able to successfully meet the challenges they face.

Q. DOES TEGA CAY FACE ADDITIONAL EXTRAORDINARY BUSINESS RISKS?

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[9] Congressional Budget Office (November 2002) ix.
"Fact Sheet: "EPA's 2007 Drinking Water Infrastructure Needs Survey and Assessment", United States Environmental

A. Yes. Tega Cay faces additional extraordinary business risk due to its smaller size relative to the proxy groups because, all else equal, size has a bearing on risk.

Q. PLEASE EXPLAIN WHY SIZE HAS A BEARING ON BUSINESS RISK.

A. Smaller companies are simply less able to cope with significant events which affect sales, revenues and earnings. In general, the loss of revenues from a few larger customers, for example, would have a greater effect on a small company than on a much larger company with a larger customer base. Moreover, smaller companies are generally less diverse in their operations and experience less financial flexibility. In addition, the effect of extreme weather conditions, i.e., prolonged droughts or extremely wet weather will have a greater affect upon a small operating water utility than upon the much larger, more geographically diverse holding companies.

Further evidence of the risk effects of size include the fact that investors demand greater returns to compensate for a lack of marketability and liquidity for the securities of smaller firms. Because Tega Cay is the regulated utility to whose rate base the Commission's ultimately allowed overall cost of capital will be applied, the relevant risk reflected in the cost of capital must be that of Tega Cay, including the impact of its small size on common equity cost rate. Tega Cay is smaller than the average proxy group company based upon the results of a study of the market capitalization of the six water companies and ten LDCs as shown on page 3 of Schedule 1 and in Table 2 below as of April 9, 2010.

Protection Agency, Office of Water, February 2009, 1.

Table 2

	Market Capitalization(1) ($ Millions)	Times Greater than the Company
Tega Cay	$5.749	
	5.332	
Proxy Group of Six AUS Utility Reports Water Companies	759.657	132.1x
Proxy Group of Eight AUS Utility Reports Gas Distribution Cos.		1,593.253298.8x

(1) From page 3 of Schedule 1.

Because Tega Cay's common stock is not publicly traded, I have assumed that if it were, its common shares would be selling at the same market-to-book ratio as the average market-to-book ratio for each proxy group, 192.8% and 178.8%, respectively, on April 9, 2010 as shown on page 4 of Schedule 1. Hence, Tega Cay's market capitalization is estimated at $5.749 million and $5.332 million based upon the average market-to-book ratio of each proxy group, respectively. In contrast, the market capitalization of the average AUS Utility Reports water company was $759.657 million on April 9, 2010, or 132.1 times the size of Tega Cay's estimated market capitalization while the market capitalization of the average AUS Utility Reports LDC was $1.593 billion, or 298.8 times larger than Tega Cay's estimated market capitalization. It is conventional wisdom, supported by actual returns over time that smaller companies tend to be more risky causing investors to expect greater returns as compensation for that risk.

Q. DOES THE FINANCIAL LITERATURE AFFIRM A RELATIONSHIP BETWEEN SIZE AND COMMON EQUITY COST RATE?

A. Yes. Eugene F. Fama and Kenneth R. French, distinguished professors of finance at the Graduate School of Business at the University of Chicago and the Tuck School of Business of Dartmouth College, respectively, developed the Fama-French 3-factor asset pricing model. The model is presented in their article entitled, "The Capital Asset Pricing Model: Theory and Evidence", published in The Journal of Economic Perspectives, Volume 18, Number 3, Summer 2004, pages 25-46, and includes size as one of the three factors.

In addition, Brigham[10] states:

> A number of researchers have observed that portfolios of small-firms have earned consistently higher average returns than those of large-firms stocks; this is called "small-firm effect." On the surface, it would seem to be advantageous to the small firms to provide average returns in a stock market that are higher than those of larger firms. In reality, it is bad news for the small firm; what *the small-firm effect means is that the capital market demands higher returns on stocks of small firms than on otherwise similar stocks of the large firms.* (italics added)

V. FINANCIAL RISK

Q. PLEASE DEFINE FINANCIAL RISK AND EXPLAIN WHY IT IS IMPORTANT TO THE DETERMINATION OF A FAIR RATE OF RETURN.

A. Financial risk is the additional risk created by the introduction of senior capital, i.e., debt and preferred stock, into the capital structure. In other words, the higher the proportion of senior capital in the capital structure, the higher the financial risk which must be factored into the common equity cost rate,

[10] Eugene F. Brigham, Fundamentals of Financial Management, Fifth Edition (The Dryden Press, 1989) 623.

consistent with the basic financial principle of risk and return, investors demand a higher common equity return as compensation for bearing higher investment risk.

In November 2007, S&P published its electric, gas and water utility ratings rankings in a framework consistent with the manner in which it presents its rating conclusions across all other corporate sectors. As S&P stated[11]:

> Incorporating utility ratings into a shared framework to communicate the fundamental credit analysis of a company furthers the goals of transparency and comparability in the ratings process.
>
> * * *
>
> The utilities rating methodology remains unchanged, and the use of the corporate risk matrix has not resulted in any changes to ratings or outlooks. The same five factors that we analyzed to produce a business risk score in the familiar 10-point scale are used in determining whether a utility possesses an "Excellent," "Strong," "Satisfactory," "Weak," or "Vulnerable" business risk profile.

S&P expanded its Business Risk / Financial Risk Matrix in May 2009 in an effort to augment its independence, strengthen the rating process and increase S&P's transparency to better serve its markets (see page 11 of Schedule 2).

Pages 1 through 9 of Schedule 2 describe the utility bond rating process. Pages 10 through 15 describe S&P's May 2009 expansion of its Business Risk /Financial Risk Matrix with the new business risk/financial risk matrix shown in Table 1 on page 11 of Schedule 2 and the financial risk indicative ratios for utilities shown in Table 2 on page 13. Notwithstanding the metrics published in

[11] Standard & Poor's – Ratings Direct – "U.S. Utilities Ratings Analysis Now Portrayed In The S&P Corporate Ratings Matrix" (November, 30, 2007) 2.

Table 2, S&P states:

> The rating matrix indicative outcomes are what we typically observe – but are not meant to be precise indications or guarantees of future rating opinions. Positive and negative nuances in our analysis may lead to a notch higher or lower than the outcomes indicated in the various cells of the matrix.

As shown on Schedule 10, page 2, the average S&P bond rating (issuer credit rating), business risk profile and financial risk profile of the six water companies are split A+/A (A), Excellent and Intermediate, while the average for the ten LDCs are A (A-), Excellent and Significant.

Q. CAN ONE NEVERTHELESS MEASURE THE COMBINED BUSINESS RISKS, I.E., INVESTMENT RISK OF AN ENTERPRISE USING BOND RATINGS AND CREDIT RATINGS?

A. Yes, similar bond ratings/issuer credit ratings reflect and are representative of similar combined business and financial risks, i.e., total risk faced by bond investors. Although specific business or financial risks may differ between companies, the same bond rating indicates that the combined risks are similar, albeit not necessarily equal, as the bond rating process reflects an acknowledgment of all diversifiable business and financial risks in order to assess credit quality or credit risk. Risk distinctions within a bond rating category are recognized by a plus or minus. For example, within the A category, an S&P rating can be at A+, A, or A-. Similarly, Moody's ratings within the A category are distinguished by the rating gradations of A1, A2 and A3. Moreover, additional risk distinction is reflected by S&P in the assignment of one of six business risk profiles, as shown in Table 1 on Schedule 2, Page

11. For example, S&P expressly indicates that the bond/credit rating process encompasses a qualitative analysis of business and financial risks (see pages 3 through 9 of Schedule 2). While not a means by which one can specifically quantify the differential in common equity risk between companies, the bond (credit) rating provides a useful means to compare/differentiate investment risk between companies because it is the result of a thorough and comprehensive analysis of all diversifiable business risks, i.e., investment risk.

VI. TEGA CAY WATER SERVICE, INC.

Q. HAVE YOU REVIEWED THE FINANCIAL INFORMATION OF TEGA CAY?

A. Yes. Tega Cay provides water to approximately 1,790 customers and wastewater service to approximately 1,690 customers in the City of Tega Cay in York County. Tega Cay is a subsidiary of Utilities, Inc. Thus, the Company's common stock is not publicly traded.

VII. PROXY GROUPS

Q. PLEASE EXPLAIN HOW YOU CHOSE THE PROXY GROUP OF SIX AUS UTILITY REPORTS WATER COMPANIES.

A. The basis of selection for the proxy group of six AUS Utility Reports water companies was to select those companies which meet the following criteria: 1) they are included in the Water Company Group of AUS Utility Reports (April 2010); 2) they have Value Line or Reuters consensus five-year EPS growth rate projections; 3) they have a positive Value Line five-year DPS growth rate projection: 4) they have a Value Line adjusted beta; 5) they have not cut or omitted their common dividends during the five years ending 2009 or through

the time of the preparation of this testimony; 6) they have 60% or greater of 2009 total operating income derived from and 60% or greater of 2009 total assets devoted to regulated water operations; and 7) which, at the time of the preparation of this testimony, had not publicly announced that they were involved in any major merger or acquisition activity.

Q. PLEASE DESCRIBE SCHEDULE 3.

A. Schedule 3 contains comparative capitalization and financial statistics for the six AUS Utility Reports water companies for the years 2005 - 2009. Page 1 contains a summary of the comparative data for the years 2005-2009. Page 2 contains notes relevant to page 1, as well as the basis of selection and names of the individual companies in the proxy group.

During the five-year period ending 2009, the historically achieved average earnings rate on book common equity for the group averaged 9.21%. The average common equity ratio based upon total permanent capital (excluding short-term debt) was 50.48%, and the average dividend payout ratio was 76.04%

Total debt as a percent of EBITDA for the years 2005-2009 ranged between 4.15 and 4.77 times, averaging 4.43 times, while funds from operations relative to total debt ranged from 15.83% to 17.05%, averaging 16.24%.

Q. PLEASE EXPLAIN HOW YOU CHOSE THE PROXY GROUP OF TEN AUS UTILITY REPORTS NATURAL GAS DISTRIBUTION COMPANIES.

A. Because of the small number of publicly traded water companies available for

use as proxies for Tega Cay as well as the limited availability of comprehensive investment analyst coverage for those companies, I have also utilized a proxy group of gas distribution companies. Like water companies, these gas distribution companies deliver a commodity, i.e., natural gas to customers through a similar distribution system whose service rates of return are set by the regulatory ratemaking process. As discussed previously, water companies face greater risk compared with natural gas distribution companies due to the greater capital intensity and lower depreciation rates of the water utility industry. The basis of selection for the proxy group of ten AUS Utility Reports natural gas distribution companies was to include those companies which meet the following criteria: 1) they are included in the Natural Gas Distribution and Integrated Gas Company Group of AUS Utility Reports (April 2010); 2) they have Value Line or Reuters consensus five-year EPS growth rate projections; 3) they have positive Value Line five-year DPS growth rate projections; 4) they have a Value Line adjusted beta; 5) they have not cut or omitted their common dividends during the five years ending 2009 or to the time of the preparation of this testimony; 6) they have 60% or greater of 2009 total operating income derived from and 60% or greater of 2009 total assets devoted to regulated gas distribution operations and 7) which, at the time of the preparation of this testimony, had not publicly announced that they were involved in any major merger or acquisition activity.

Q. PLEASE DESCRIBE SCHEDULE 4.

A. Schedule 4 contains comparative capitalization and financial statistics for the

ten AUS Utility Reports natural gas distribution companies for the years 2005 - 2009. Page 1 contains a summary of the comparative data for the years 2005-2009. Page 2 contains notes relevant to page 1, as well as the basis of selection and names of the individual companies in the proxy group, while Page 3 contains capital structure ratios based upon total permanent capital (excluding short-term debt) by company and on average for the years 2005-2009. During the five-year period ending 2009, the historically achieved average earnings rate on book common equity for this group averaged 11.53%. The average common equity ratio based upon total permanent capital (excluding short-term debt) was 51.68%, and the average dividend payout ratio was 62.51%.

Total debt as a percent of EBITDA for the years 2005-2009 ranged between 3.52 and 4.10 times, averaging 3.77 times during the five-year period, while funds from operations relative to total debt ranged from 18.86% to 24.90%, and averaging 20.47% during the five-year period.

VIII. COMMON EQUITY COST RATE MODELS

A. THE EFFICIENT MARKET HYPOTHESIS (EMH)

Q. ARE THE COST OF COMMON EQUITY MODELS YOU USE MARKET-BASED MODELS, AND HENCE BASED UPON THE EMH?

A. Yes. The DCF model is market-based in that market prices are utilized in developing the dividend yield component of the model. The RPM is market-based in that the bond ratings and expected bond yields used in the application of the RPM reflect the market's assessment of bond/credit risk. In addition, the

use of betas to determine the equity risk premium also reflects the market's assessment of market/systematic risk as betas are derived from regression analyses of market prices. The CAPM is market-based for many of the same reasons that the RPM is market-based i.e., the use of expected bond (Treasury bond) yields and betas. The CEM is market-based in that the process of selecting the comparable risk non-utility companies is based upon statistics which result from regression analyses of market prices and reflect the market's assessment of total risk. Therefore, all the cost of common equity models I utilize are market-based models, and hence based upon the EMH.

Q. PLEASE DESCRIBE THE CONCEPTUAL BASIS OF THE EMH.

A. The EMH, which is the foundation of modern investment theory, was pioneered by Eugene F. Fama[12] in 1970. An efficient market is one in which security prices reflect all relevant information all the time, with the implication that prices adjust instantaneously to new information, thus reflecting the intrinsic fundamental economic value of a security.[13]

The generally-accepted "semistrong" form of the EMH asserts that all publicly available information is fully reflected in securities prices, i.e., that fundamental analysis cannot enable an investor to "out-perform the market" in the long-run as noted by Brealey and Myers[14]. The "semistrong" form of the EMH is generally held to be true because the use of insider information often

[12] Eugene F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work" (Journal of Finance, May 1970) 383-417.

[13] Roger A. Morin, New Regulatory Finance (Public Utility Reports, Inc., 2006) 279-281.

[14] Brealey, Richard A. and Myers, Stewart C., Principles of Corporate Finance 1st Ed., (McGraw-Hill, 1996) 329.

enables investors to earn excessive returns by "outperforming the market" in the short-run. This means that all perceived risks are taken into account by investors in the prices they pay for securities. Investors are aware of all publicly-available information, including bond/credit ratings, discussions about companies by bond/credit rating agencies and investment analysts as well as the discussions of the various common equity cost rate methodologies (models) in the financial literature. In an attempt to emulate investor behavior, no single common equity cost rate model should be relied upon exclusively in determining a cost rate of common equity and the results of multiple costs of common equity models should be taken into account. The academic literature provides substantial support for the need to rely upon more than one cost of common equity model in arriving at a recommended common equity cost rate.

Q. PLEASE DESCRIBE THE ACADEMIC LITERATURE SUPPORTING THE USE OF MORE THAN ONE COST OF COMMON EQUITY MODEL.

A. Also, Morin[15] states:

> Each methodology requires the exercise of considerable judgment on the reasonableness of the assumptions underlying the methodology and on the reasonableness of the proxies used to validate a theory. *The inability of the DCF model to account for changes in relative market valuation, discussed below, is a vivid example of the potential shortcomings of the DCF model when applied to a given company.* Similarly, the inability of the CAPM to account for variables that affect security returns other than beta tarnishes its use. (italics added)
>
> No one individual method provides the necessary level of precision for determining a fair return, but each method provides useful evidence to facilitate the exercise of an informed judgment.

[15] Morin 428, 430 - 431.

Reliance on any single method or preset formula is inappropriate when dealing with investor expectations because of possible measurement difficulties and vagaries in individual companies' market data. (Morin, p. 428)

* * *

The financial literature supports the use of multiple methods. Professor Eugene Brigham, a widely respected scholar and finance academician, asserts:[1](footnote omitted)

> Three methods typically are used: (1) the Capital Asset Pricing Model (CAPM), (2) the discounted cash flow (DCF) method, and (3) the bond-yield-plus-risk-premium approach. These methods are not mutually exclusive – no method dominates the others, and all are subject to error when used in practice. Therefore, when faced with the task of estimating a company's cost of equity, we generally use all three methods and then choose among them on the basis of our confidence in the data used for each in the specific case at hand.

Another prominent finance scholar, Professor Stewart Myers, in an early pioneering article on regulatory finance, stated:[2](footnote omitted)

> Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means you should not use any one model or measure mechanically and exclusively. Beta is helpful as one tool in a kit, to be used in parallel with DCF models or other techniques for interpreting capital market data.

Reliance on multiple tests recognizes that no single methodology produces a precise definitive estimate of the cost of equity. As stated in Bonbright, Danielsen, and Kamerschen (1988), '*no single or group test or technique is conclusive*.' Only a fool discards relevant evidence. (italics in original) (Morin, p. 430)

* * *

While it is certainly appropriate to use the DCF methodology to estimate the cost of equity, there is no proof that the DCF produces a more accurate estimate of the cost of equity than other methodologies. Sole reliance on the DCF model ignores the capital market evidence and financial theory formalized in the

> CAPM and other risk premium methods. The DCF model is one of many tools to be employed in conjunction with other methods to estimate the cost of equity. *It is not a superior methodology that supplants other financial theory and market evidence. The broad usage of the DCF methodology in regulatory proceedings in contrast to its virtual disappearance in academic textbooks does not make it superior to other methods. The same is true of the Risk Premium and CAPM methodologies.* (italics added) (Morin, p. 431)

In view of all of the foregoing, it is clear that investors are or should be aware of all of the models available for use in determining a common equity cost rate and in absence of empirical evidence to the contrary, it is reasonable to assume that, collectively, investors consider them all.

B. DISCOUNTED CASH FLOW MODEL (DCF)

Q. WHAT IS THE THEORETICAL BASIS OF THE DCF MODEL?

A. The theory underlying the DCF model is that the present value of an expected future stream of net cash flows during the investment holding period can be determined by discounting the cash flows at the cost of capital, or the investors' capitalization rate. DCF theory indicates that an investor buys a stock for an expected total return rate which is derived from cash flows received in the form of dividends plus appreciation in market price (the expected growth rate). In other words, the dividend yield on market price plus a growth rate equals the capitalization rate, i.e., the total common equity return rate expected by investors.

Q. PLEASE COMMENT UPON THE APPLICABILITY OF THE DCF MODEL IN ESTABLISHING A COST OF COMMON EQUITY FOR TEGA CAY.

A. The DCF model has a tendency to mis-specify investors' required common

equity return rate when the market value of common stock differs significantly from its book value. Mathematically, because the “simplified” DCF model traditionally used in rate regulation assumes a market-to-book ratio of one, it understates/overstates investors' required return rate when market value exceeds or is less than book value. It does so because, in many instances, market prices reflect investors' assessments of long-range market price growth potentials (consistent with the infinite investment horizon implicit in the standard regulatory version of the DCF model) not fully reflected in analysts' shorter range forecasts of future growth in earnings per share (EPS) and dividends per share (DPS), both accounting proxies. Thus, the market-based DCF model will result in a total annual dollar return on book common equity equal to the total annual dollar return expected by investors only when market and book values are equal, a rare and unlikely situation. In recent years, the market values of utilities’ common stocks have been well in excess of their book values as shown on page 1 of Schedules 3 and 4 ranging between 184.85% and 233.68% for the six AUS Utility Reports water companies and 148.87% and 163.48% for of ten LDCs.

Under DCF theory, the rate of return investors require is related to the market price paid for a security. Thus, market prices form the basis of investment decisions and investors’ expected rates of return. In contrast, a regulated utility is generally limited to earning on its net book value (depreciated original cost) rate base. Market values can diverge from book values for a myriad of macroeconomic reasons including, but not limited to,

EPS and DPS expectations, merger or acquisition expectations, interest rates, investor sentiment, unemployment levels, monetary policy etc.

Traditional rate base/rate of return regulation, where a market-based common equity cost rate is applied to a book value rate base, presumes that market-to-book ratios are at unity or 1.00. However, there is ample empirical evidence over sustained periods which demonstrate that this is an incorrect presumption. Since market-to-book ratios of unity or 1.00 are rarely the case as discussed above, regulatory allowed ROEs, i.e., earnings, have a limited effect on utilities' market/book ratios as the market prices of utility common stocks are also influenced by factors beyond the direct influence of the regulatory process.

As noted by Phillips:[16]

> Many question the assumption that market price should equal book value, believing that 'the earnings of utilities should be sufficiently high to achieve market-to-book ratios which are consistent with those prevailing for stocks of unregulated companies.'

In addition, Bonbright[17] states:

> In the first place, commissions cannot forecast, except within wide limits, the effect their rate orders will have on the market prices of the stocks of the companies they regulate. In the second place, *whatever the initial market prices may be, they are sure to change not only with the changing prospects for earnings, but with the changing outlook of an inherently volatile stock market.* In short, market prices are beyond the control, though not beyond the influence of rate regulation. Moreover, even if a commission did possess the power of control, any attempt to exercise it ... would result in harmful, uneconomic shifts in public utility rate levels. (italics added)

[16] Phillips, Charles F., The Regulation of Public Utilities – Theory and Practice (Public Utility Reports, Inc., 1993) 395.

[17] James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates (Public Utilities Reports, Inc., 1988) 334.

Q. IS IT REASONABLE TO EXPECT THE MARKET VALUES OF UTILITIES' COMMON STOCKS TO CONTINUE TO SELL WELL ABOVE THEIR BOOK VALUES?

A. Yes. Although the market-to-book ratios of regulated utilities have been vacillating recently due to the effects on the economic and capital market by the recent recession and fledgling recovery, in my opinion, the common stocks of utilities will continue to sell substantially above their book values, on average, because many investors, especially individuals who traditionally committed less capital to the equity markets, will likely continue to commit a greater percentage of their available capital to common stocks in view of lower interest rate alternative investment opportunities and to provide for retirement. The recent past and current capital market environment is in stark contrast to the late 1970's and early 1980's when very high (by historical standards) yields on secured debt instruments in public utilities were available. Despite the fact that the market declined significantly during late 2001 through 2003, following the September 11, 2001 tragedy, dipping to a low in March 2009, the recent recovery of the market, and despite recent and continuing market volatility due to energy prices, the stressed housing market, the credit crunch in the fragile U.S. economy, continuing high unemployment and agreement among economists that the U.S. has begun to recover from the economic recession with the length, pace, and persistence of recovery as yet to be determined, the majority of utility stocks, on average, have continued to sell at market prices well above their book value. In addition, as previously discussed, such

sustained high market-to-book ratios have been influenced by factors other than fundamentals such as actual and reported growth in EPS and DPS.

Q. HAVE ANY REGULATORY COMMISSIONS RECOGNIZED THIS TENDENCY OF THE DCF MODEL TO UNDERSTATE/OVERSTATE INVESTORS' REQUIRED RETURN RATE WHEN MARKET-TO-BOOK RATIOS ARE GREATER/LESS THAN UNITY?

A. Yes. The Pennsylvania Public Utilities Commission (PA PUC) recognized this tendency in its order of August 26, 2005 in Docket No. R-00049862, et al re: The City of Lancaster – Sewer Fund when it adopted the Administrative Law Judge's market-to-book adjustment of 65 basis points (0.65%) because such an adjustment was "consistent with our recent orders in *PAWC, Aqua,* and *PPL*" and "as in *PPL*, we find that adjustment is necessary <u>because the DCF method produces the investor required return based on the current market price, not the return on the book value capitalization.</u>" With the MTB adjustment, the equity return allowance is 10.75 percent. (emphasis added)

Similarly, in 1994, the Indiana Utility Regulatory Commission (IURC) recognized the tendency of the DCF model to understate the cost of equity when market value exceeds book value noting that[18]:

> [u]nder the traditional DCF model . . . the appropriate earnings level of the utility would not be derived by applying the DCF result to the market price of the Company's stock . . . it would be applied to the utility's net original cost rate base. *If the market price of the stock exceeds its book value, . . . the investor will not achieve the return which the model finds is necessary.* (italics added)

More recently, the PA PUC affirmed the tendency of the DCF model to mis-

[18] Re: Indiana-American Water Company, Inc. 150 PUR4th 141, 167-168 (IN URC 1994).

specify investors' required return in its Order of February 8, 2007 in Docket No. R-00061398, et al re: PPL Gas Utilities Corporation when it stated:

> The ALJ stated that the OTS and the OCA are correct that the Commission favors the DCF method to determine the cost of equity. However, the ALJ concluded, based on recent precedent, that the Commission consistently has adopted a leverage adjustment to compensate for the difference between market prices and book value (used in ratemaking). (*See, Aqua Pennsylvania*, 204, 234 (2004); *Pa. PUC v. PPL Electric Utilities Corp*., Docket No. R-00049255, at 70-71 (2004); *Pa. PUC v. Pennsylvania American Water Co.*, 2002 Pa. PUC LEXIS 1; *Pa. PUC v. Phila. Suburban Water Co*., 219 PUR4TH 272 (2002); *Pa. PUC v. Pennsylvania American Water Co*., 231 PUR4TH 277 (2004)). According to the ALJ, these cases are persuasive that a leverage adjustment should be employed with the DCF analysis. (R.D. at 62-63).

Q. CAN THE UNDER- OR OVERSTATEMENT OF THE INVESTORS' REQUIRED RATE OF RETURN ON THE MARKET BY THE DCF MODEL BE DEMONSTRATED MATHEMATICALLY?

A. Yes. Schedule 5 demonstrates how a market-based DCF cost rate applied to a book value which is either below or above market value will either understate or overstate the investors' required return on market value. As shown, there is no realistic opportunity to earn the expected market-based rate of return on book value. In Column 1, investors expect a 10.00% return on a market price of $24.00. Column 2 shows that when the 10.00% return rate on market value is applied to book value which is approximately 55.5% of market value, the total annual return opportunity is just $1.333 on book value. With an annual dividend of $0.840, there is an opportunity for growth of $0.493 which is just 2.05% in contrast to the 6.50% growth in market price expected by investors.

Conversely, in Column 3, where the market-to-book ratio is 80%, when

the 10.00% return rate on market value is applied to a book value which is approximately 25.0% greater than market value, the total annual return opportunity is $3.000 on book value with an annual dividend of $0.840, there is an opportunity for growth of $2.160 which is 9.00% in contrast to the 6.50% growth in market price expected by investors.

Hence, it is clear that the DCF model either understates/overstates investors' required cost of common equity capital when market values exceed/are less than their underlying book values and thus multiple cost of common equity models should be relied upon, rather than exclusive reliance upon the DCF model, when estimating investors' expectations.

Q. HAVE ANY COMMISSIONS EXPLICITLY STATED THAT THE DCF MODEL SHOULD NOT BE RELIED UPON EXCLUSIVELY?

A. Yes. In my experience, the majority of regulatory commissions rely upon a combination of the various cost of common equity models available.

Specifically, the Iowa Utilities Board (IUB) has recognized the tendency of the DCF model to understate investors' expected cost of common equity capital when market values are significantly above their book values. In its June 17, 1994 Final Decision and Order in Re U.S. West Communications, Docket No. RPU-93-9 the IUB stated:[19]

> While the Board has relied in the past on the DCF model, in *Iowa Electric Light and Power Company*, Docket No. RPU-89-9, "Final Decision and Order" (October 15, 1990), the Board stated: '[T]he DCF model may understate the return on equity in some circumstances. This is particularly true when the market is relatively volatile and the company in question has a market-to-

[19] Re: U.S. West Communications, Inc. 152 PUR4th 446, 459 (IA UB 1994).

> book ratio in excess of one." Those conditions exist in this case and the Board will not rely on the DCF return. (Consumer Advocate Ex. 367, See Tr. 2208, 2250, 2277, 2283-2284). *The DCF approach underestimates the cost of equity needed to assure capital attraction during this time of market uncertainty and volatility*. *The board will, therefore, give preference to the risk premium approach.* (italics added)

Also, the Hawaii Public Utilities Commission (HPUC) recognized this phenomenon in a decision dated June 30, 1992[20] in a case regarding Hawaiian Electric Company, Inc., when it stated:

> In this docket, as in other rate proceedings, experts disagree on the relative merits of the various methods of determining the cost of common equity. In this docket, HECO is particularly critical of the use of the constant growth DCF methodology. It asserts that method is imbued with downward bias and, thus, its use will understate common equity cost. *We are cognizant of the shortcomings of the DCF method.* There are, however, shortcomings to be found with the use of CAPM and the RP methods as well. We reiterate that, despite the problems with the use of any methodology, *all methods should be considered and that the DCF method and the combined CAPM and RP methods should be given equal weight.* (italics added)

Q. DO OTHER COST OF COMMON EQUITY MODELS CONTAIN UNREALISTIC ASSUMPTIONS AND HAVE SHORTCOMINGS?

A. Yes. That is why I am not recommending that <u>any</u> of the models be relied upon exclusively. I have focused on the shortcomings of the DCF model because some regulatory commissions and rate of return witnesses still place excessive or exclusive reliance upon it. Although the DCF model is useful, as noted previously, it is not a superior methodology that supplants financial theory and market evidence based upon other valid cost of common equity

[20] Re: Hawaiian Electric Company, Inc., 134 PUR4th 418, 479 (HI PUC 1992).

models. For these reasons, no model, including the DCF, should be relied upon exclusively.

Q. WHICH VERSION OF THE DCF MODEL DO YOU USE?

A. I utilize the single-stage constant growth DCF model because, in my experience, it is the most widely utilized version of the DCF used in public utility rate regulation. In my opinion, it is widely utilized because utilities are generally in the mature stage of their lifecycles and not transitioning from one growth stage to another. This is especially true for water utilities.

All companies, including utilities, go through typical life cycles in their development, initially progressing through a growth stage, moving onto a transition stage and finally assuming a steady-state or constant growth state. However, the U.S. public utility industry is a long-standing industry in the U.S., dating back to approximately 1882. The standards of rate of return regulation of public utilities date back to the previously discussed principles of fair rate of return established in the Hope and Bluefield decisions of 1944 and 1923, respectively. Hence, the public utility industry in the U.S. is a stable and mature industry characterized by the steady-state or constant-growth stage of a multi-stage DCF model. The economics of the utility industry reflect the features of this relative stability and demand maturity. As regulated businesses, their returns on capital investment, i.e., rate base, are set through a ratemaking process and not determined in the competitive markets. This characteristic, taken together with the longevity of the public utility industry, all contribute to the stability and maturity of the industry, including the water utility

industry.

Since there is no basis for applying multi-stage growth versions of the DCF model to determine the common equity cost rates of mature public utility companies the constant growth model is most appropriate.

Q. PLEASE DESCRIBE THE DIVIDEND YIELD YOU USED IN YOUR APPLICATION OF THE DCF MODEL.

A. The unadjusted dividend yields are based upon an average of a recent spot date (April 9, 2010) as well as an average of the three months ended March 31, 2010, respectively, which are derived on Schedule 7. The average unadjusted dividend yield is 3.56% and the median is 3.54% for the six water companies and 4.06% and 4.23%, respectively, for the ten LDCs.

Q. PLEASE EXPLAIN THE DIVIDEND GROWTH COMPONENT SHOWN ON SCHEDULE 6, COLUMN 2.

A. Because dividends are paid quarterly, or periodically, as opposed to continuously (daily), an adjustment must be made to the dividend yield. This is often referred to as the discrete, or the Gordon Periodic, version of the DCF model.

Since the various companies in the proxy groups increase their quarterly dividend at various times during the year, a reasonable assumption is to reflect one-half the annual dividend growth rate in the dividend yield component, or $D_{1/2}$. This is a conservative approach which does not overstate the dividend yield which should be representative of the next twelve-month period. Therefore, the actual average dividend yields in Column 1 on Schedule 8 have

been adjusted upward to reflect one-half the growth rates shown in Column 4.

Q. PLEASE EXPLAIN THE BASIS OF THE GROWTH RATES OF THE PROXY GROUPS WHICH YOU USE IN YOUR APPLICATION OF THE DCF MODEL.

A. Schedule 8 shows that approximately 58% of the common shares of the six water companies and 46% of the common shares of the ten LDCs are held by individuals as opposed to institutional investors. Individual investors are particularly likely to place great significance on the opinions expressed by financial information services, such as Value Line and Reuters, which are easily accessible and/or available on the Internet and through public libraries. Investors realize that analysts have significant insight into the dynamics of the industries and individual companies they analyze, as well as companies' abilities to effectively manage the effects of changing laws and regulations and ever changing economic and market conditions.

Over the long run, there can be no growth in DPS without growth in EPS. Earnings expectations have a more significant, but not sole, influence on market prices than dividend expectations. Thus, the use of earnings growth rates in a DCF analysis provides a better matching between investors' market price appreciation expectations and the growth rate component of the DCF. Earnings expectations have a significant influence on market prices and their appreciation or "growth" experienced by investors. This should be evident even to relatively unsophisticated investors just by listening to financial new reports on radio, TV or reading the newspapers. In fact, Dr. Morin in his book,

New Regulatory Finance, (2006) states on page 298[21]:

> Because of the dominance of institutional investors and their influence on individual investors, analysts' forecasts of long-run growth rates provide a sound basis for estimating required returns. Financial analysts exert a strong influence on the expectations of many investors who do not possess the resources to make their own forecasts, that is, they are a cause of g. The accuracy of these forecasts in the sense of whether they turn out to be correct is not at issue here, as long as they reflect widely held expectations. As long as the forecasts are typical and/or influential in that they are consistent with current stock price levels, they are relevant. The use of analysts' forecasts in the DCF model is sometimes denounced on the grounds that it is difficult to forecast earnings and dividends for only one year, let alone for longer time periods. This objection is unfounded, however, because it is present investor expectations that are being priced; it is the consensus forecast that is embedded in price and therefore in required return, and not the future as it will turn out to be.
>
> * * *
>
> Published studies in the academic literature demonstrate that growth forecasts made by security analysts represent an appropriate source of DCF growth rates, are reasonable indicators of investor expectations and are more accurate than forecasts based on historical growth. These studies show that investors rely on analysts' forecasts to a greater extent than on historic data only.

In addition, Myron Gordon, the "father" of the standard regulatory version of the DCF model widely utilized throughout the United States in rate base/rate of return regulation has recognized the significance of analysts' forecasts of growth in EPS in a speech he gave in March 1990 before the Institute for Quantitative Research and Finance. He said:

> We have seen that earnings and growth estimates by security analysts were found by Malkiel and Cragg to be superior to data obtained from financial statements for the explanation of

[21] Morin 298.

> variation in price among common stocks. . . estimates by security analysts available from sources such as IBES are far superior to the data available to Malkiel and Cragg. Eq (7) is not as elegant as Eq (4), but it has a good deal more intuitive appeal. It says that investors buy earnings, but what they will pay for a dollar of earnings increases with the extent to which the earnings are reflected in the dividend or in appreciation through growth.

Professor Gordon recognized that total return is largely affected by the terminal price which is mostly affected by earnings (hence price / earnings multiples). However, while EPS is the most significant factor influencing market prices, it is by no means the only factor that affects market prices, a fact recognized by Bonbright with regard to public utilities as discussed previously.

Studies performed by Cragg and Malkiel[22] demonstrate that analysts' forecasts are superior to historical growth rate extrapolations. Some question the accuracy of analysts' forecast of EPS growth, however, it does not really matter what the level of accuracy of those analysts' forecasts is well after the fact. What is important is that they influence investors and hence the market prices they pay. Moreover, there is no empirical evidence that investors consistent with the EMH, would discount or disregard analysts' estimates of growth in earnings per share. The "semistrong" form of the EMH which is generally held to be true indicates that all perceived risks are taken into account by investors in the prices they pay for securities and investors are aware of all publicly-available information, including bond ratings, discussions

[22] John G. Cragg and Burton G. Malkiel, Expectations and the Structure of Share Prices (University of Chicago Press, 1982) Chapter 4.

about companies by bond rating agencies and investment analysts, as well as the many analysts earnings growth forecasts available. Investors are also aware of the accuracy of past forecasts, whether for EPS or DPS growth or for interest rates levels. Investors have no prior knowledge of the accuracy of any forecasts available at the time they make their investment decisions, as that accuracy only becomes known after some future period of time has elapsed. Therefore, consistent with the EMH upon which the cost of common equity models I utilize are based, since investors have such analysts' earnings growth rate projections available to them and investors are aware of the accuracy of such projections, analysts earnings projections should be relied upon in a cost of common equity analysis.

In addition to the empirical and academic support discussed previously regarding the superiority of analysts' EPS growth forecasts in response to concern about the use of analysts' forecasts, Dr. Burton G. Malkiel, the Chemical Bank Chairman's Professor of Economics at Princeton University and author of the widely read national bestseller book on investing entitled, "A Random Walk Down Wall Street," Professor Malkiel affirmed his belief in the superiority of analysts' earnings forecasts when he testified before the Public Service Commission of South Carolina, in November 2002:

> With all the publicity given to tainted analysts' forecasts and investigations instituted by the New York Attorney General, the National Association of Securities Dealers, and the Securities & Exchange Commission, I believe the upward bias that existed in the late 1990s has indeed diminished. In summary, I believe that current analysts' forecasts are more reliable than they were during the late 1990s. Therefore, analysts' forecasts remain the proper tool to use in performing a Gordon Model DCF analysis.

(Rebuttal testimony, South Carolina Electric and Gas Co., pp. 16-17, Docket No. 2002-223-E)

Consequently, I have reviewed analysts' projected growth in EPS, as well as Value Line's projected five-year compound growth rates in EPS for each company in the proxy groups which are summarized on page 1, Schedule 9.

Q. PLEASE SUMMARIZE THE DCF MODEL RESULTS.

A. As shown on Schedule 6, the results of the application of the single-stage DCF model are 11.71% using the average and 11.70% when using the median value of the six water company's results. As also shown on Schedule 6, the results of the application of the single-stage DCF model are 9.09% using the average and 9.42% when using the median value of the ten LDCs' result. In arriving at conclusions of indicated common equity cost rate for the proxy groups, I have relied upon the median of the results of the DCF, due to the wide range of DCF results as well as the continuing volatile capital market conditions. In my opinion, the median is a more accurate and reliable measure of central tendency, and provides recognition to all the DCF results.

In view of the foregoing, as shown on Schedule 6 the indicated common equity cost rate based upon the application of the DCF model is 11.70% for the six water companies and 9.42% for the ten LDCs.

C. THE RISK PREMIUM MODEL (RPM)

Q. PLEASE DESCRIBE THE THEORETICAL BASIS OF THE RPM.

A. The RPM is based upon the basic financial principle of risk and return, namely,

that investors require a greater return for bearing greater risk. The RPM recognizes that common equity capital has greater investment risk than debt capital, as common equity shareholders are last in line in any claim on a company's earnings and assets, with debt holders being first in line. Therefore, investors require higher returns from common stocks than from investment in bonds to compensate them for bearing the additional risk.

While the investors' required common equity return cannot be directly determined or observed, bond returns and yields can. According to RPM theory one can assess a common equity risk premium over bonds, either historically or prospectively and then use that premium to derive a cost rate of common equity.

In summary with RPM theory, the cost of common equity equals the expected cost rate for long-term debt capital plus a risk premium to compensate common shareholders for the added risk of being unsecured and last-in-line for any claim on the corporation's assets and earnings.

Q. SOME ANALYSTS STATE THAT THE RPM IS ANOTHER FORM OF THE CAPM. DO YOU AGREE?

A. While there are some similarities, there is a very significant distinction between the two models. The RPM and CAPM both add a "risk premium" to an interest rate. However, the beta approach to the determination of an equity risk premium in the RPM should not be confused with the CAPM. Beta is a measure of systematic, or market, risk, a relatively small percentage of total risk (the sum of both non-diversifiable systematic and diversifiable

unsystematic risk). Unsystematic risk is fully captured in the RPM through the use of the long-term public utility bond yield as can be shown by reference to pages 3 through 9 of Schedule 2 which confirm that the bond/credit rating process involves an assessment of business and financial risks. In contrast, the use of a risk-free rate of return in the CAPM does not, and by definition cannot, reflect a company's specific, i.e., unsystematic, risk. Consequently, a much larger portion of the total common equity cost rate is reflected in the company- or proxy group-specific bond yield (a product of the bond rating) than is reflected in the risk-free rate in the CAPM, or indeed even by the dividend yield employed in the DCF model. Moreover, the financial literature recognizes the RPM and CAPM as two separate and distinct cost of common equity models.

Q. HAVE YOU PERFORMED RPM ANALYSES OF COMMON EQUITY COST RATE FOR THE PROXY GROUPS?

A. Yes. The results of my application of the RPM are summarized on page 1 of Schedule 10 and detailed on pages 2 through 9. The first step is to determine the expected bond yield.

Q. PLEASE EXPLAIN THE BASIS OF THE EXPECTED BOND YIELDS OF 6.20% AND 6.34% APPLICABLE TO THE PROXY GROUPS OF WATER AND GAS COMPANIES, RESPECTIVELY.

A. Because both ratemaking and the cost of common equity are prospective in nature, a prospective yield on similarly-rated long-term debt is essential. As shown on Schedule 10, page 2, although based upon only one water company,

the average Moody's bond rating is A2 for the six water companies while the average Moody's bond rating is A3 for the ten LDCs. I relied upon a consensus forecast of about 50 economists of the expected yield on Aaa rated corporate bonds for the six calendar quarters ending with the third calendar quarter of 2011 as derived from the April 1, 2010 Blue Chip Financial Forecasts (shown on page 7 of Schedule 10). As shown on Line No. 1 of page 1 of Schedule 10, the average expected yield on Moody's Aaa rated corporate bonds is 5.68%. It is necessary to adjust that average yield to be equivalent to a Moody's A2 rated public utility bond, requiring the adjustment of 0.52%, shown on Line No. 2 and explained in Note 2. After adjustment, the expected bond yield applicable to a Moody's A rated public utility bond is 6.20% as shown on Line No. 3.

The six water companies average Moody's bond rating is A2 therefore, no adjustment is necessary to make the prospective bond yield applicable to an A2 public utility bond. However, because the average Moody's bond rating of the ten LDCs is A3, an adjustment of 14 basis points (0.14%) is necessary to make the prospective bond yield applicable to an A3 public utility bond as shown on line No. 5. Therefore, the expected specific bond yields are 6.20% for the six water companies and 6.34% for the ten LDCs as shown on line No. 6.

Q. PLEASE EXPLAIN THE METHOD UTILIZED TO ESTIMATE THE EQUITY RISK PREMIUM.

A. I evaluated the results of two different historical equity risk premium studies, as

well as Value Line's forecasted total annual market return in excess of the prospective yield on high grade corporate bonds, as detailed on pages 5, 6 and 8 of Schedule 10. As shown on Line No.3, page 5, the mean equity risk premium is 4.36% applicable to the six water companies and 4.19% applicable to the of ten LDCs. These estimates are the result of an average of a beta-derived historical equity risk premium as well as the mean historical equity risk premium applicable to public utilities with bonds rated A based upon holding period returns.

The basis of the beta-derived equity risk premiums applicable to the proxy groups is shown on page 6 of Schedule 10. The beta-determined equity risk premium should receive substantial weight because betas are derived from the market prices of common stocks over a recent five-year period. Beta is a meaningful measure of prospective relative risk to the market as a whole and is a logical means by which to allocate a relative share of the market's total equity risk premium.

The total market equity risk premium utilized is 6.51% and is based upon an average of the long-term historical market risk premium and forecasted market risk premium as well as an equity risk premium based upon a study of the holding period returns of the S&P Public Utility Index relative to A rated public utility bond yields. To derive the historical market equity risk premium, I used the most recent Morningstar[23] data on holding period returns for the S&P 500 Composite Index from the Ibbotson® SBBI® 2010 Valuation Yearbook –

[23] Morningstar, Inc. acquired Ibbotson Associates in 2006.

Market Results for Stocks, Bonds, Bills and Inflation – 1926-2009 (SBBI-2010) and the average historical yield on Moody's Aaa and A rated corporate bonds for the period 1926-2009. The use of holding period returns over a very long period of time is useful in the beta approach because it is consistent with the long-term investment horizon presumed by the DCF model. As the SBBI – 2010 states[24]:

> The estimate of the equity risk premium depends on the length of the data series studied. A proper estimate of the equity risk premium requires a data series long enough to give a reliable average without being unduly influenced by very good and very poor short-term returns. When calculated using a long data series, the historical equity risk premium is relatively stable.[5] Furthermore, because an average of the realized equity risk premium is quite volatile when calculated using a short history, using a long series makes it less likely that the analyst can justify any number he or she wants. The magnitude of how shorter periods can affect the result will be explored later in this chapter.
>
> Some analysts estimate the expected equity risk premium using a shorter, more recent time period on the basis that recent events are more likely to be repeated in the near future; furthermore, they believe that the 1920s, 1930s and 1940s contain too many unusual events. This view is suspect because all periods contain "unusual" events. Some of the most unusual events this century took place quite recently, including the inflation of the late 1970s and early 1980s, the October 1987 stock market crash, the collapse of the high-yield bond market, the major contraction and consolidation of the thrift industry, the collapse of the Soviet Union, the development of the European Economic Community, and the attacks of September 11, 2001 and the more recent liquidity crisis of 2008 and 2009.
>
> It is even difficult for economists to predict the economic environment of the future. For example, if one were analyzing the stock market in 1987 before the crash, it would be statistically improbable to predict the impending short-term volatility without considering the stock market crash and market volatility of the

[24] Ibbotson® SBBI® – 2010 Valuation Yearbook – Market Results for Stocks, Bonds, Bills and Inflation – 1926 – 2009 (Morningstar, Inc., 2010) 59.

1929-1931 period.

> Without an appreciation of the 1920s and 1930s, no one would believe that such events could happen. The 84-year period starting with 1926 is representative of what can happen: it includes high and low returns, volatile and quiet markets, war and peace, inflation and deflation, and prosperity and depression. Restricting attention to a shorter historical period underestimates the amount of change that could occur in a long future period. Finally, because historical event-types (not specific events) tend to repeat themselves, long-run capital market return studies can reveal a great deal about the future. Investors probably expect "unusual" events to occur from time to time, and their return expectations reflect this. (footnote omitted)

Consequently, the long-term arithmetic mean total return rates on the market as a whole of 11.80% and the long-term arithmetic mean yield on corporate bonds of 6.10% were used, as shown at Line Nos. 1 and 2 of page 6 of Schedule 10. As shown on Line No. 3 of page 6, the resultant long-term historical equity risk premium on the market as a whole is 5.70%.

I used arithmetic mean return rates and yields (income returns) because they are appropriate for cost of capital purposes as noted in the SBBI – 2010. Arithmetic mean return rates and yields are appropriate because ex-post (historical) total returns and equity risk premiums differ in size and direction over time, providing insight into the variance and standard deviation of returns. Because the arithmetic mean captures the prospect for variance in returns and equity risk premiums, it provides the valuable insight needed by investors in estimating future risk when making a current investment. Absent such valuable insight into the potential variance of returns, investors cannot meaningfully evaluate prospective risk. If investors alternatively relied upon the geometric mean of ex-post equity risk premiums, they would have no insight into the

potential variance of future returns because the geometric mean relates the change over many periods to a constant rate of change, thereby obviating the year-to-year fluctuations, or variance, *critical to risk analysis.*

Q. HOW DID YOU INCORPORATE VALUE LINE'S FORECASTED TOTAL ANNUAL MARKET RETURN IN EXCESS OF THE PROSPECTIVE YIELD ON HIGH RATED CORPORATE BONDS IN YOUR DEVELOPMENT OF AN EQUITY RISK PREMIUM FOR YOUR RPM ANALYSIS?

A. The basis of the forecasted market equity risk premium can be found on Line Nos. 4 through 6 on page 6 of Schedule 10. It is derived from an average of the most recent 3-month (using the months of January 2010 through March 2010) and a recent spot (April 6, 2010) 3-5 year median market price appreciation potentials by Value Line plus an average of the median estimated dividend yield for the common stocks of the 1,700 firms covered in Value Line's Standard Edition as explained in detail in Note 1 on page 3 of Schedule 11.

The average median expected price appreciation is 52% which translates to 11.04% per annum and, when added to the average (similarly calculated) median dividend yield of 1.95% equates to a forecasted annual total return rate on the market as a whole of 12.99%. Thus, this methodology is consistent with the use of the 3-month and spot dividend yields in my application of the DCF model. To derive the forecasted total market equity risk premium of 7.31% shown on Schedule 10, page 6, Line No. 6, the April 1, 2010 forecast of about 50 economists of the expected yield on Moody's Aaa rated corporate bonds for the six calendar quarters ending with the third calendar quarter 2011 of 5.68%

from Blue Chip Financial Forecasts was deducted from the forecasted total market return of 12.99%. The calculation resulted in an expected market risk premium of 7.31%.

In arriving at my conclusion of equity risk premium of 6.51% on Line No. 7 on page 6 of Schedule 10, I have given equal weight to the historical equity risk premium of 5.70% and the forecasted equity risk premium of 7.31% shown on Line Nos. 3 and 6, respectively (6.51% = (5.70% + 7.31%)/2).

Q. WHAT IS YOUR CONCLUSION OF AN EQUITY RISK PREMIUM FOR USE IN YOUR RPM ANALYSIS?

A. On page 9 of Schedule 10, the most current Value Line betas for the companies in the proxy groups are shown. Applying the median beta of the proxy groups, consistent with my reliance upon the median DCF results as previously discussed, to the market equity risk premium of results in a beta adjusted equity risk premium of 4.56% for the proxy group of six water companies and 4.23% for the proxy group of ten LDCs as shown on page 6, Line No. 9.

A mean equity risk premium of 4.15% applicable to utilities with A rated public utility bonds such as the proxy group of six water companies and the proxy group of ten LDCs was calculated based upon holding period returns from a study using public utilities, as shown on Line No. 2, page 5 of Schedule 10 and is detailed on page 8.

The equity risk premiums applicable to the proxy group of six water companies and ten LDCs are the averages of the beta-derived premiums and

those based upon the holding period returns of public utilities with A rated bonds, as summarized on Schedule 10, page 5, i.e., 4.36% and 4.19%, respectively.

Q. WHAT ARE THE INDICATED RPM COMMON EQUITY COST RATES?

A. They are 10.56% for the six water companies and 10.53% for the ten LDCs as shown on Schedule 10, page 1.

Q. SOME CRITICS OF THE RPM MODEL CLAIM THAT ITS WEAKNESS IS THAT IT PRESUMES A CONSTANT EQUITY RISK PREMIUM. IS SUCH A CLAIM VALID?

A. No. The equity risk premium varies inversely with interest rate changes, although not in tandem with those changes. The presumption of a constant equity risk premium is no different than the presumption of a constant "g", or growth component, in the DCF model. If one calculates a DCF cost rate today, the absolute result "k", as well as the growth component "g", would invariably differ from a calculation made just one or several months earlier or later. This implies that "g" does change, although in the application of the standard DCF model, "g" is presumed to be constant. Hence, there is no difference between the RPM and DCF models in that both models assume a constant component, but in reality, these components, "g" and the equity risk premium both change.

As Morin[25] states with respect to the DCF model:

> It is not necessary that *g* be constant year after year to make the model valid. *The growth rate may vary randomly around some average expected value. Random variations around trend are perfectly acceptable, as long as the mean expected*

[25] Morin 256.

> *growth is constant*. The growth rate must be 'expectationally constant' to use formal statistical jargon. (italics added)

The foregoing confirms that the RPM is similar to the DCF model. Both assume an "expectationally constant" risk premium and growth rate, respectively, but in reality both vary (change) randomly around an arithmetic mean. Consequently, the use of the arithmetic mean, and not the geometric mean is confirmed as appropriate in the determination of an equity risk premium as discussed previously.

D. THE CAPITAL ASSET PRICING MODEL (CAPM)

Q. PLEASE EXPLAIN THE THEORETICAL BASIS OF THE CAPM.

A. CAPM theory defines risk as the covariability of a security's returns with the market's returns as measured by beta ("β"). A beta less than 1.0 indicates lower variability while a beta greater than 1.0 indicates greater variability than the market.

The CAPM assumes that all other risk, i.e., all non-market or unsystematic risk, can be eliminated through diversification. The risk that cannot be eliminated through diversification is called market, or systematic, risk. In addition the CAPM presumes that investors require compensation only for these systematic risks which are caused by macroeconomic and other events that affect the returns on all assets. The model is applied by adding a risk-free rate of return to a market risk premium, which is adjusted proportionately to reflect the systematic risk of the individual security relative to the market as measured by beta. The traditional CAPM model is expressed as:

$$R_s = R_f + \beta(R_m - R_f)$$

Where: R_s = Return rate on the common stock

R_f = Risk-free rate of return

R_m = Return rate on the market as a whole

β = Adjusted beta (volatility of the security relative to the market as a whole)

Numerous tests of the CAPM have measured the extent to which security returns and betas are related as predicted by the CAPM and have confirmed its validity. However, Morin observes that while the results of these tests support the notion that beta is related to security returns, the empirical Security Market Line (SML) described by the CAPM formula is not as steeply sloped as the predicted SML. Morin[26] states:

> With few exceptions, the empirical studies agree that … low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than predicted.
>
> * * *
>
> Therefore, the empirical evidence suggests that the expected return on a security is related to its risk by the following approximation:
>
> $$K = R_F + x\,\beta(R_M - R_F) + (1-x)\,\beta(R_M - R_F)$$
>
> where x is a fraction to be determined empirically. The value of x that best explains the observed relationship Return = 0.0829 + 0.0520 β is between 0.25 and 0.30. If x = 0.25, the equation becomes:
>
> $$K = R_F + 0.25(R_M - R_F) + 0.75\,\beta(R_M - R_F)$$[27]

[26] Morin 175.

[27] Morin 190.

In view of theory and practical research, I have applied both the traditional CAPM and the ECAPM to the companies in the proxy groups and averaged the results.

Q. PLEASE DESCRIBE YOUR SELECTION OF A RISK-FREE RATE OF RETURN.

A. As shown at the top of column 3 on page 2 of Schedule 11, the risk-free rate adopted for both applications of the CAPM is 4.97%. It is based upon the average consensus forecast of the reporting economists in the April 1, 2010 Blue Chip Financial Forecasts as shown in Note 2, page 3, of the expected yields on 30-year U.S. Treasury bonds for the six quarters ending with the third calendar quarter 2011.

Q. WHY IS THE PROSPECTIVE YIELD ON LONG-TERM U.S. TREASURY BONDS APPROPRIATE FOR USE AS THE RISK-FREE RATE?

A. The yield on long-term U.S. Treasury T-Bonds is almost risk-free and its term is consistent with the long-term cost of capital to public utilities measured by the yields on A rated public utility bonds, the long-term investment horizon inherent in utilities' common stocks, the long-term investment horizon presumed in the standard DCF model employed in regulatory ratemaking, and the long-term life of the jurisdictional rate base to which the allowed fair rate of return, i.e., cost of capital will be applied. Morin[28] discusses several reasons why the yield on long-term U.S. Treasury T-bonds is appropriate as the risk-free rate:

- Common stock is a long-term investment with the dividend cash flows to

[28] Morin 151.

investors lasting indefinitely. Hence, the yield on very long-term government bonds, such as, the yield on 30-year Treasury bonds, is the best measure of the risk-free rate for use in the CAPM.

- The expected common stock return is based on long-term cash flows, regardless of an individual's holding time period.
- Stability and consistency, i.e., the yields on long-term Treasury bonds match more closely with expected common stock returns.
- Yields on 90-day Treasury Bills typically do not match the investor's planning horizons. Investors in common stocks, typically, have an investment horizon greater than 90 days.
- Short-term rates are volatile, fluctuating widely, and subject to more random disturbances than are long-term rates, resulting in volatile and unreliable common equity return estimates.
- Short-term rates are also largely "administered" rates, and used by the Federal Reserve as a policy vehicle for economic stimulation and money supply control. Foreign governments, companies, and individuals also use them as a temporary safe harbor for money.

In addition, as noted in the SBBI - 2010[29]:

> Although the equity risk premia of several horizons are available, the long-horizon equity risk premium is preferable for use in most business-valuation settings, even if an investor has a shorter time horizon. Companies are entities that generally have no defined life span; when determining a company's value, it is important to use a long-term discount rate because the life of the company is assumed to be infinite. For this reason, it is appropriate in most cases to use the long-horizon equity risk premium for business valuation.

Q. PLEASE EXPLAIN THE ESTIMATION OF THE EXPECTED EQUITY RISK PREMIUM FOR THE MARKET.

A. The basis of the market equity risk premium is explained in detail in Note 1 on page 3 of Schedule 11. It is derived from an average of the most recent 3-month (using the months of January 2010 through March 2010) and a recent spot (April 6, 2010) 3-5 years median total market price appreciation projects from Value Line, of total return of 12.99%, discussed previously, and the long-

[29] SBBI 2010 55.

term historical arithmetic mean total returns for the years 1926 – 2009 on large company stocks from the SBBI - 2010 of 11.80%. From these returns, the appropriate projected and historical risk-free rates are subtracted to arrive at a projected and historical equity risk premium for the market.

I used arithmetic mean return rates and yields (income returns) because they are appropriate for cost of capital purposes as noted in the SBBI 2010.

Arithmetic mean return rates and yields are appropriate because ex-post (historical) total returns and equity risk premiums differ in size and direction over time, providing insight into the variance and standard deviation of returns. Because the arithmetic mean captures the prospect for variance in returns and equity risk premiums, it provides the valuable insight needed by investors in estimating future risk when making a current investment. Absent such valuable insight into the potential variance of returns, investors cannot meaningfully evaluate prospective risk. If investors alternatively relied upon the geometric mean of ex-post equity risk premiums, they would have no insight into the potential variance of future returns because the geometric mean relates the change over many periods to a constant rate of change, thereby obviating the year-to-year fluctuations, or variance, *critical to risk analysis.*

For example, from the Value Line projected total market return of 12.99%, the forecasted average risk-free rate of 4.97% was deducted indicating a forecasted market risk premium of 8.02%. From the 2010 Risk Premia Report historical total market return of 11.80%, the long-term income return on U.S. Government Securities of 5.20% was deducted indicating, an

historical equity risk premium of 6.60%. Thus, the projected and historical total market risk premiums are 8.02% and 6.60%, averaging 7.31%. As a measure of risk relative to the market as a whole, it is appropriate to use beta to apportion the market risk premium to a specific company or group when the proxy groups' respective betas are applied to the average 7.31% market risk premium to arrive at proxy group specific risk premiums.

Q. WHAT ARE THE RESULTS OF YOUR APPLICATION OF THE TRADITIONAL AND EMPIRICAL CAPM TO THE PROXY GROUPS?

A. As shown on Schedule 11, Line No. 1 of page 1, the traditional CAPM cost rates are 10.09% for the proxy group of six water companies and 9.72% for the proxy group of ten LDCs. And, as shown on Line No. 2 of page 1, the empirical CAPM cost rates are 10.64% for the six water companies and 10.36% for the ten LDCs. The traditional and empirical CAPM cost rates are shown individually by company on page 2. As with the DCF results discussed previously, and for the same reasons, namely the range of results and the current extremely volatile capital markets, I rely upon the median results of the traditional CAPM and ECAPM for the proxy groups. Thus, as shown on Line No. 3 on page 1, the CAPM cost rate applicable to the proxy group of six water companies is 10.37%, and the CAPM cost rate applicable to the proxy group of ten LDCs is 10.04% based upon the traditional and empirical CAPM.

Q. SOME CRITICS OF THE ECAPM MODEL CLAIM THAT USING ADJUSTED BETAS IN A TRADITIONAL CAPM AMOUNTS TO USING AN ECAPM. IS SUCH A CLAIM VALID?

A. No. Using adjusted betas in a CAPM analysis is not equivalent to the ECAPM. Betas are adjusted because of the regression tendency of betas to converge toward 1.0 over time, i.e., over successive calculations of beta. As discussed previously, numerous studies have determined that the Security Market Line (SML) described by the CAPM formula at any given moment in time is not as steeply sloped as the predicted SML. Morin[30] states:

> Some have argued that the use of the ECAPM is inconsistent with the use of adjusted betas, such as those supplied by Value Line and Bloomberg. This is because the reason for using the ECAPM is to allow for the tendency of betas to regress toward the mean value of 1.00 over time, and, since Value Line betas are already adjusted for such trend [sic], an ECAPM analysis results in double-counting. This argument is erroneous. Fundamentally, the ECAPM is not an adjustment, increase or decrease, in beta. This is obvious from the fact that the expected return on high beta securities is actually lower than that produced by the CAPM estimate. The ECAPM is a formal recognition that the observed risk-return tradeoff is flatter than predicted by the CAPM based on myriad empirical evidence. The ECAPM and the use of adjusted betas comprised two separate features of asset pricing. Even if a company's beta is estimated accurately, the CAPM still understates the return for low-beta stocks. Even if the ECAPM is used, the return for low-beta securities is understated if the betas are understated. Referring back to Figure 6-1, the ECAPM is a return (vertical axis) adjustment and not a beta (horizontal axis) adjustment. Both adjustments are necessary.

Moreover, the slope of the Security Market Line (SML) should not be confused with beta. As Eugene F. Brigham, finance professor emeritus and the author of many financial textbooks states[31] :

> The slope of the SML reflects the degree of risk aversion in the economy – the greater the average investor's aversion to risk, then (1) the steeper is the slope of the line, (2) the greater is the

[30] Morin 191.

[31] Eugene F. Brigham, Financial Management – Theory and Practice, 4th Ed. (The Dryden Press, 1985) 203.

> risk premium for any risky asset, and (3) the higher is the required rate of return on risky assets.[12]
>
> [12]Students sometimes confuse beta with the slope of the SML. This is a mistake. As we saw earlier in connection with Figure 6-8, and as is developed further in Appendix 6A, beta does represent the slope of a line, but *not* the Security Market Line. This confusion arises partly because the SML equation is generally written, in this book and throughout the finance literature, as $k_i = R_F + b_i(k_M - R_F)$, and in this form b_i looks like the slope coefficient and $(k_M - R_F)$ the variable. It would perhaps be less confusing if the second term were written $(k_M - R_F)b_i$, but this is not generally done.

In addition, regulatory support for the ECAPM can be found in the New York Public Service Commission's Generic Financing Docket, Case 91-M-0509. Also, the Regulatory Commission of Alaska (RCA) in its Order No. 151 in Docket No. P-97-4 (Order entered 11/27/02) re: In the Matter of the Correct Calculation and Use of Acceptable Input Data to Calculate the 1997, 1998, 1999, 2000, 2001 and 2002 Tariff Rates for the Intrastate Transportation of Petroleum over the TransAlaska Pipeline System, noted:

> Although we primarily rely upon Tesoro's recommendation, we are concerned, however, about Tesoro's CAPM analysis. Tesoro averaged the results it obtained from CAPM and ECAPM while at the same time providing empirical testimony[604] (footnote omitted) that the ECAPM results are more accurate then [sic] traditional CAPM results. The reasonable investor would be aware of these empirical results. Therefore, we adjust Tesoro's recommendation to reflect only the ECAPM result.

Thus, using adjusted betas in an ECAPM analysis is not incorrect, nor inconsistent with either their financial literature or regulatory precedent. Notwithstanding empirical regulatory precedent and support for the use of only the ECAPM, my CAPM analysis, which includes both the traditional CAPM and the ECAPM, is a conservative approach resulting in a reasonable estimate of

the cost of common equity.

E. COMPARABLE EARNINGS MODEL (CEM)

Q. PLEASE DESCRIBE YOUR APPLICATION OF THE COMPARABLE EARNINGS MODEL AND HOW IT IS USED TO DETERMINE COMMON EQUITY COST RATE.

A. My application of the CEM is summarized on Schedule 12 which consists of four pages. Pages 1 and 2 show the CEM results for the proxy group of six water companies and page 3 shows the CEM results for the proxy group of ten LDCs. Page 4 contains notes related to pages 1 through 3.

The comparable earnings approach is derived from the "corresponding risk" standard of the landmark cases of the U.S. Supreme Court. Therefore, it is consistent with the Hope doctrine that the return to the equity investor should be commensurate with returns on investments in other firms having corresponding risks.

The CEM is based upon the fundamental economic concept of opportunity cost which maintains that the true cost of an investment is equal to the cost of the best available alternative use of the funds to be invested. The opportunity cost principle is also consistent with one of the fundamental principles upon which regulation rests: that regulation is intended to act as a surrogate for competition and to provide a fair rate of return to investors.

The CEM is designed to measure the returns expected to be earned on the book common equity, net worth, or partners' capital of similar risk enterprises. Thus, it provides a direct measure of return, since it translates into

practice the competitive principle upon which regulation rests. In my opinion, it is inappropriate to use the achieved returns of regulated utilities of similar risk because to do so would be circular as achieved returns are a function of authorized ROEs, i.e., the regulatory process itself, and inconsistent with the principle of equality of risk with non-price regulated firms.

Consequently, the first step in determining a cost of common equity using the comparable earnings model is to choose an appropriate proxy group or groups of non-price regulated firms similar in risk to the proxy group or groups of price-regulated utilities. The proxy group(s) should be broad-based in order to obviate any company-specific aberrations. As stated previously, utilities need to be eliminated to avoid circularity since the returns on book common equity of utilities are substantially influenced by regulatory awards and are therefore not representative of the returns that could be earned in a truly competitive market.

Q. PLEASE DESCRIBE YOUR APPLICATION OF THE CEM.

A. As stated previously, my application of the CEM is market-based in that the selection criteria for the non-price regulated firms of comparable risk are based upon statistics derived from the market prices paid by investors.

Two proxy groups of domestic, non-price regulated firms were chosen to reflect both the systematic and unsystematic risks, equaling total risk, of the proxy groups of six water companies and ten LDCs, respectively. The proxy group of eighty-nine non-utility companies similar in risk to the proxy group of six water companies and twenty-six non-utility companies similar in total

investment risk to the proxy group of ten LDCs are listed on pages 1 through 3, Schedule 12. The criteria used in the selection of these proxy companies were that they be domestic non-utility companies and have a meaningful rate of return on common equity, net worth, or partners' capital reported in Value Line (Std. Ed.) projected for 2012-2014. Value Line betas were used as a measure of systematic risk. The standard error of the regression was used as a measure of each firm's unsystematic or specific risk with the standard error of the regression reflecting the extent to which events specific to a company's operations will affect its stock price. In essence, companies which have similar betas and standard errors of the regressions, have similar investment risk, i.e., the sum of systematic (market) risk as reflected by beta and unsystematic (business and financial) risk, as reflected by the standard error of the regression. Those statistics are derived from regression analyses using market prices which, under the EMH, reflect all relevant risks. The application of these criteria results in proxy groups of non-price regulated firms similar in risk to the average company in each proxy group.

Using a Value Line, Inc. proprietary database dated March 15, 2010, proxy groups of eighty-nine and twenty-six non-price regulated companies were chosen based upon ranges of unadjusted beta and standard error of the regression. The ranges were based upon the standard deviations of the unadjusted beta and the average standard error of the regression for the proxy group of six water companies and the proxy group of ten LDCs as explained in Notes 1 and 7 on page 4 of Schedule 12.

In my opinion, this selection methodology is meaningful and effectively responds to the criticisms normally associated with the selection of non-regulated firms presumed to be comparable in total risk. This is because the selection of non-price regulated companies comparable in total risk is based upon regression analyses of market prices which reflect investors' assessment of all risks, diversifiable and non-diversifiable. Thus, the empirical selection process is market-based and results in companies comparable in total risk, (i.e.) both systematic and unsystematic risks.

Once proxy group(s) of non-price regulated companies are selected, it is then necessary to derive returns on book common equity, net worth or partners' capital for the companies in the group(s). These are measured using the rate of return on common equity, net worth or partners' capital by Value Line (Std. Ed.) projected for the next five years consistent with the use of five-year projected EPS growth rates in the DCF model.

Q. WHAT ARE YOUR CONCLUSIONS OF CEM COST RATE?

A. For the proxy group of six water companies, my conclusion based upon the average of the median of all of the five-year projected returns on book common equity, net worth or partners' capital is 14.50% as shown on page 2 of Schedule 12. And my conclusion for the proxy group of ten LDCs based upon the median of all of the five-year projected returns on book common equity, net worth or partners' capital is 20.00% as shown on page 3.

After applying a test of significance (Student's t-statistic) to determine whether any of the projected returns are significantly different from their

respective means at the 95% confidence level, the projected returns of several companies have been excluded. After excluding these outliers, my conclusion of CEM cost rate is 14.00% for the six water companies and 20.00% for the ten gas distribution companies. However, in my opinion, the 20.00% CEM result for the ten LDCs is an outlier when compared with the six water companies' 14.00% CEM result as well as the results of the other cost of common equity models for the ten LDCs. Therefore, I will not rely upon it in determining a common equity cost rate based upon the ten LDCs.

IX. CONCLUSION OF RANGE OF COMMON EQUITY COST RATE

Q. WHAT IS YOUR OF RECOMMENDED RANGE OF COMMON EQUITY COST RATE?

A. It is 10.90% - 11.45% based upon the common equity cost rates resulting from all four cost of common equity models consistent with the EMH, which logically mandates the use of multiple cost of common equity models as adjusted for Tega Cay's greater business risk.

Moreover, absent empirical evidence to the contrary, it is reasonable to assume that investors rely equally upon multiple cost of common equity models in arriving at their required returns on common equity. Therefore, in formulating my recommended range of common equity cost rate of 10.90% - 11.45%, I reviewed the results of the application of four different cost of common equity models, namely, the DCF, RPM, CAPM, and CEM for the two proxy groups. I employ all four cost of common equity models as primary tools in arriving at my recommended range of common equity cost rate because; 1)

no single model is so inherently precise that it can be relied upon solely, to the exclusion of other theoretically sound models; 2) all four models have application problems associated with them; 3) all four models are based upon the Efficient Market Hypothesis (EMH), which as previously discussed, requires the assumption that investors rely upon multiple cost of common equity models; and 4) as demonstrated previously, the prudence of using multiple cost of common equity models is supported in both the financial literature and regulatory precedent. Therefore, none should be relied upon exclusively to estimate investors' required rate of return on common equity.

The results of the four cost of common equity models applied to the proxy groups of six water companies and the proxy group of ten LDCs are shown on Schedule 1, page 2 and summarized below:

Table 3

	Proxy Group of Six AUS Utility Reports Water Companies	Proxy Group of Ten AUS Utility Rpts. Gas Distribution Companies
Discounted Cash Flow Model	11.70%	9.42%
Risk Premium Model	10.56	10.53
Capital Asset Pricing Model	10.37	10.04
Comparable Earnings Model	14.00	NMF
Indicated Common Equity Cost Rate Before Adjustment for Business Risk	11.15%	10.00%
Business Risk Adjustment	0.30	0.40
Indicated Common Equity Cost Rate After Adjustment for Business Risk	11.45%	10.40%
Recommended Common Equity Cost Rate	10.90% - 11.45%	

Based upon these common equity cost rate results, I conclude that common equity cost rates of 11.15% and 10.00% are indicated for the water and gas distribution proxy groups, respectively before the business risk adjustments as shown on Line No. 6, page 2 of Schedule 1. However, the indicated common equity cost rates of 11.15% and 10.00% are applicable to the larger, less business risky proxy water companies and proxy LDCs.

Q. IS THERE A WAY TO QUANTIFY A BUSINESS RISK ADJUSTMENT DUE TO TEGA CAY'S SMALL SIZE RELATIVE TO THE TWO PROXY GROUPS?

A. Yes. As discussed previously, Tega Cay has greater business risk than the

average of both proxy groups because of its smaller size relative to both groups, measured by book capitalization or the market capitalization of common equity (estimated market value for Tega Cay, whose common stock is not traded). Therefore, it is necessary to upwardly adjust the common equity cost rates of 11.15% based upon the water companies and 10.00% based upon the LDCs. The adjustments are based upon data contained in SBBI - 2010. The determinations are based on the size premiums for decile portfolios of New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ listed companies for the 1926-2009 period and related data shown on page 11 of Schedule 1. The average size premium for the decile in which each proxy group falls has been compared with the average size premium for the decile in which Tega Cay would fall if its stock were traded and sold at the April 9, 2010 average market/book ratio of 192.8% and 178.8% experienced by each proxy group, respectively. As shown on page 3, because Tega Cay falls in the 10th decile and the six water companies fall between the 7th and 8th deciles, the size premium spread between Tega Cay and the six water companies is 417 basis points (4.17%). Because the ten LDCs fall between the 5th and 6th deciles, the size premium spread between Tega Cay and LDCs is 457 basis points (4.57%).

Consequently, a business risk adjustment of 4.17% due to size is indicated relative to the six water companies and an adjustment of 4.57% is indicated relative to the ten LDCs. Nevertheless, conservatively reasonable business risk adjustments of 30 basis points (0.30%) were made relative to the

water proxy group and 40 basis points (0.40%) relative to the LDC proxy groups as shown on Line No. 6 on page 2 of Schedule 1 to its indicated common equity cost rate to reflect Tega Cay's greater relative business risk due to size as discussed previously.

A range of common equity cost rate of 10.90% - 11.45%, while giving more consideration to the results of the water group, when applied to the Tega Cay's ratemaking common equity at March 31, 2010 results in an overall range of rate of return of 8.65% - 8.91%, which, in my opinion, is both reasonable and conservative and will provide Tega Cay with sufficient earnings to enable it to attract necessary new capital.

Q. DOES THAT CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

APPENDIX A

PROFESSIONAL QUALIFICATIONS

OF

PAULINE M. AHERN, CRRA
PRINCIPAL

AUS CONSULTANTS

PROFESSIONAL QUALIFICATIONS
OF
PAULINE M. AHERN, CRRA
PRINCIPAL
AUS CONSULTANTS

PROFESSIONAL EXPERIENCE

1994-Present

In 1996, I became a Principal of AUS Consultants, continuing to offer testimony as an expert witness on the subjects of fair rate of return and cost of capital before state public utility commissions. I provide assistance and support to clients throughout the entire ratemaking litigation process. In addition, I supervise the financial analyst and administrative staff in the preparation of fair rate of return and cost of capital exhibits which are filed along with expert testimony before various state and federal public utility regulatory bodies. The team also assists in the preparation of interrogatory responses, as well as rebuttal exhibits.

As the Publisher of AUS Utility Reports (formerly C. A. Turner Utility Reports), I am responsible for the production, publishing, and distribution of the reports. AUS Utility Reports provides financial data and related ratios for about 125 public utilities, i.e., electric, combination gas and electric, natural gas distribution, natural gas transmission, telephone, and water utilities, on a monthly, quarterly and annual basis. Among the subscribers of AUS Utility Reports are utilities, many state regulatory commissions, federal agencies, individuals, brokerage firms, attorneys, as well as public and academic libraries. The publication has continuously provided financial statistics on the utility industry since 1930.

As the Publisher of AUS Utility Reports, I also supervise the production, publishing, and distribution of the AGA Rate Service publications under license from the American Gas Association. I am also responsible for maintaining and calculating the performance of the AGA Index, a market capitalization weighted index of the common stocks of the approximately 70 corporate members of the AGA.

As an Assistant Vice President from 1994 - 1996, I prepared fair rate of return and cost of capital exhibits which are filed along with expert testimony before various state and federal public utility regulatory bodies. These supporting exhibits include the determination of an appropriate ratemaking capital structure and the development of embedded cost rates of senior capital. The exhibits also support the determination of a recommended return on common equity through the use of various market models, such as, but not limited to, Discounted Cash Flow analysis, Capital Asset Pricing Model and Risk Premium Methodology, as well as an assessment of the risk characteristics of the client utility. I also assisted in the preparation of responses to any interrogatories received regarding such testimonies filed on behalf of client utilities. Following the filing of fair rate of return testimonies, I assisted in the evaluation of opposition testimony in order to prepare interrogatory questions, areas of cross-examination, and rebuttal testimony. I also evaluated and assisted in the preparation of briefs and exceptions

following the hearing process. I have submitted testimony before state public utility commissions regarding appropriate capital structure ratios and fixed capital cost rates.

1990-1994

As a Senior Financial Analyst, I supervised two analysts in the preparation of fair rate of return and cost of capital exhibits which are filed along with expert testimony before various state and federal public utility regulatory bodies. The team also assisted in the preparation of interrogatory responses as well as rebuttal exhibits.

I evaluated the final orders and decisions of various commissions to determine whether further actions are warranted and to gain insight which may assist in the preparation of future rate of return studies.

I assisted in the preparation of an article authored by Frank J. Hanley and A. Gerald Harris entitled "Does Diversification Increase the Cost of Equity Capital?" published in the July 15, 1991 issue of Public Utilities Fortnightly.

I co-authored an article with Frank J. Hanley entitled "Comparable Earnings: New Life for an Old Precept" which was published in the American Gas Association's Financial Quarterly Review, Summer 1994.

I was awarded the professional designation "Certified Rate of Return Analyst" (CRRA) by the National Society of Rate of Return Analysts (now the Society of Utility and Regulatory Financial Analysts (SURFA)). This designation is based upon education, experience and the successful completion of a comprehensive examination.

As Administrator of Financial Analysis for AUS Utility Reports, which reports financial data for over 200 utility companies and has approximately 1,000 subscribers, I oversee the preparation of this monthly publication, as well as the annual publication, Financial Statistics - Public Utilities.

1988-1990

As a Financial Analyst, I assisted in the preparation of fair rate of return studies including capital structure determination, development of senior capital cost rates, as well as the determination of an appropriate rate of return on equity. I also assisted in the preparation of interrogatory responses, interrogatory questions of the opposition, areas of cross-examination and rebuttal testimony. I also assisted in the preparation of the annual publication C. A. Turner Utility Reports - Financial Statistics -Public Utilities.

1973-1975

As a research assistant in the Research Department of the Regional Economics Division of the Federal Reserve Bank of Boston, I was involved in the development and maintenance of econometric models to simulate regional economic conditions in New England in order to study the effects of, among other things, the energy crisis of the early 1970's and property tax revaluations on the economy of New England. I was also involved in the statistical analysis and preparation of articles for the New England Economic Review. Also, I acted as assistant editor for New England Business

Indicators.

1972

As a research assistant in the Office of the Assistant Secretary for International Affairs, U.S. Treasury Department, Washington, D.C., I developed and maintained econometric models which simulated the economy of the United States in order to study the results of various alternate foreign trade policies so that national trade policy could be formulated and recommended.

Clients Served

I have offered expert testimony before the following commissions:

Arkansas
California
Connecticut
Delaware
Florida
Hawaii
Idaho
Illinois
Indiana
Iowa
Kentucky
Louisiana
Maine
Maryland
Michigan
Missouri
Nevada
New Jersey
New York
North Carolina
Ohio
Pennsylvania
South Carolina
Virginia
Washington

I have sponsored testimony on the rate of return and capital structure effects of merger and acquisition issues for:

California-American Water Company
New Jersey-American Water Company

I have sponsored testimony on fair rate of return and related issues for:

Alpena Power Company
Applied Wastewater Management, Inc.
Aqua Illinois, Inc.
Aqua New Jersey, Inc.
Aqua Virginia, Inc.
Artesian Water Company
The Atlantic City Sewerage Company
Audubon Water Company
The Borough of Hanover, PA
Carolina Pines Utilities, Inc.
Carolina Water Service, Inc. of NC
Carolina Water Service, Inc. of SC
The Columbia Water Company
Consumers Illinois Water Company
Consumers Maine Water Company
Consumers New Jersey Water Company
City of DuBois, Pennsylvania
Elizabethtown Water Company
Emporium Water Company
GTE Hawaiian Telephone Inc.
Greenridge Utilities, Inc.

Illinois American Water Company
Iowa American Water Company
Land'Or Utility Company
Long Neck Water Company
Louisiana Water Service, Inc.
Massanutten Public Service Company
Middlesex Water Company
Missouri-American Water Company
Mt. Holly Water Company
Nero Utility Services, Inc.
New Jersey-American Water Company
The Newtown Artesian Water Company
NRG Energy Center Pittsburgh LLC
NRG Energy Center Harrisburg LLC
Ohio-American Water Company
Penn Estates Utilities
Pinelands Water Company
Pinelands Waste Water Company
Pittsburgh Thermal
San Jose Water Company
Southland Utilities, Inc.
Spring Creek Utilities, Inc.
Sussex Shores Water Company
Tega Cay Water Service, Inc.
Total Environmental Services, Inc.
Treasure Lake Water & Sewer Divisions
Thames Water Americas
Tidewater Utilities, Inc.
Transylvania Utilities, Inc
Trigen-Philadelphia Energy Corporation
Twin Lakes Utilities, Inc.
United Utility Companies
United Water Arkansas, Inc.
United Water Arlington Hills Sewerage, Inc.
United Water Connecticut, Inc.
United Water Delaware, Inc.
United Water Idaho, Inc.
United Water Indiana, Inc.
United Water New Jersey, Inc.
United Water New Rochelle, Inc.
United Water New York, Inc.
United Water Owego / Nichols, Inc.
United Water Pennsylvania, Inc.
United Water South County, Inc.
United Water Toms River, Inc.
United Water Virginia, Inc.
United Water West Lafayette, Inc.
United Water West Milford, Inc.
Utilities, Inc.
Utilities Inc. of Central Nevada
Utilities, Inc. of Florida
Utilities, Inc. of Louisiana
Utilities Inc. of Nevada
Utilities, Inc. of Pennsylvania
Utilities, Inc. - Westgate
Utilities Services of South Carolina
Utility Center, Inc.
Valley Energy, Inc.
Water Services Corp. of Kentucky
Wellsboro Electric Company
Western Utilities, Inc.

I have sponsored testimony on capital structure and senior capital cost rates for the following clients:

Alpena Power Company
Arkansas-Western Gas Company
Associated Natural Gas Company
PG Energy Inc.
United Water Delaware, Inc.
Washington Natural Gas Company

I have assisted in the preparation of rate of return studies on behalf of the following clients:

Algonquin Gas Transmission Company
Anadarko Petroleum Corporation
Arkansas-Louisiana Gas Company
Arkansas Western Gas Company
Artesian Water Company
Associated Natural Gas Company
Atlantic City Electric Company
Bridgeport-Hydraulic Company
Cambridge Electric Light Company
Carolina Power & Light Company
Citizens Gas and Coke Utility
City of Vernon, CA
Columbia Gas/Gulf Transmission Cos.
Commonwealth Electric Company
Commonwealth Telephone Company
Conestoga Telephone & Telegraph Co.
Connecticut Natural Gas Corporation
Consolidated Gas Transmission Company
Consumers Power Company
CWS Systems, Inc.
Delmarva Power & Light Company
East Honolulu Community Services, Inc.
Equitable Gas Company
Equitrans, Inc.
Florida Power & Light Company
Gary Hobart Water Company
Gasco, Inc.
GTE Arkansas, Inc.
GTE California, Inc.
GTE Florida, Inc.
GTE Hawaiian Telephone
GTE North, Inc.
GTE Northwest, Inc.
GTE Southwest, Inc.
Great Lakes Gas Transmission L.P.
Hawaiian Electric Company
Hawaiian Electric Light Company
IES Utilities Inc.
Illinois Power Company
Interstate Power Company
Interstate Power & Light Co.
Iowa Electric Light and Power Company
Iowa Southern Utilities Company
Kentucky-West Virginia Gas Company
Lockhart Power Company
Middlesex Water Company
Milwaukee Metropolitan Sewer District
Mountaineer Gas Company
National Fuel Gas Distribution Corp.
National Fuel Gas Supply Corp.
Newco Waste Systems of NJ, Inc.
New Jersey Natural Gas Company
New Jersey-American Water Company
New York-American Water Company
North Carolina Natural Gas Corp.
Northumbrian Water Company
Ohio-American Water Company
Oklahoma Natural Gas Company
Orange and Rockland Utilities
Paiute Pipeline Company
PECO Energy Company
Penn Estates Utilities, Inc
Penn-York Energy Corporation
Pennsylvania-American Water Co.
PG Energy Inc.
Philadelphia Electric Company
Providence Gas Company
South Carolina Pipeline Company
Southwest Gas Corporation
Stamford Water Company
Tesoro Alaska Petroleum Company
Tesoro Refining & Marketing Co.
United Telephone of New Jersey
United Utility Companies
United Water Arkansas, Inc.
United Water Delaware, Inc.
United Water Idaho, Inc.
United Water Indiana, Inc.
United Water New Jersey, Inc.
United Water New York, Inc.
United Water Pennsylvania, Inc.
United Water Virginia, Inc.
United Water West Lafayette, Inc.
Utilities, Inc of Pennsylvania
Utilities, Inc - Westgate
Vista-United Telecommunications Corp.
Washington Gas Light Company
Washington Natural Gas Company
Washington Water Power Corporation
Waste Management of New Jersey – Transfer Station A

Wellsboro Electric Company
Western Reserve Telephone Company
Western Utilities, Inc.
Wisconsin Power and Light Company

EDUCATION:

1973 – Clark University – B.A. – Honors in Economics (Concentration: Econometrics and
Regional/International Economics)
1991 – Rutgers University – M.B.A. – High Honors (Concentration: Corporate Finance)

PROFESSIONAL AFFILIATIONS:

American Finance Association
Financial Management Association
Society of Utility and Regulatory Financial Analysts
President – 2006-2008 and 2008-2010
Secretary/Treasurer – 2004-2006
Energy Association of Pennsylvania
National Association of Water Companies – Member of the Finance Committee

SPEAKING ENGAGEMENTS:

"A New Model for Estimating the Equity Risk Premium for Public Utilities" (co-presenter with Richard A. Michelfelder, Ph.D.) – Spring 2010 Meeting of the Staff Subcommittee on Accounting and Finance of the National Association of Regulatory Utility Commissioners in Charleston, SC, March 17, 2010.

"New Approach to Estimating the Cost of Common Equity Capital for Public Utilities" (co-presenter with Richard A. Michelfelder, Ph.D.) - Advanced Workshop in Regulation and Competition, 28th Annual Eastern Conference of the Center for Research in Regulated Industries (CRRI) at Rutgers University, May 14, 2009.

Moderator: Society of Utility and Regulatory Financial Analysis: 41st Financial Forum – "Estimating the
Cost of Capital in Today's Economic and Capital Market Environment" April 16-17, 2009, Washington, DC

AWWA Pre-Conference Workshop – Water Utility Ratemaking – March 25, 2008, Atlantic City, NJ
Topic: "Water Utility Financing: Where Does All That Cash Come From?"

PAPERS:

"A New Model to Estimating the Equity Risk Premium for Public Utilities", co-authored

with Frank J. Hanley, Dylan D'Ascendis and Richard A. Michelfelder, Ph.D., forthcoming.

"New Approach to Estimating the Cost of Common Equity Capital for Public Utilities", co-authored with Frank J. Hanley and Richard A. Michelfelder, Ph.D., forthcoming.

"Comparable Earnings: New Life for an Old Precept" co-authored with Frank J. Hanley, Financial Quarterly Review, (American Gas Association), Summer 1994.